

**Summary of fish
population data
from Sipiwesk
and Cross lakes,
1988**

Green, D.J. 1989



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ABSTRACT

Experimental netting was continued on Sipiwesk and Cross lakes in 1988 under Claim #18 of the Northern Flood Agreement. Fish population data collected from these lakes during the open water season has been summarized and presented in this report in order to make it more easily accessible for future reference.

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INTRODUCTION

Cross and Sipiwesk lakes are located on the Upper Nelson River System. Cross Lake is immediately downstream of Manitoba Hydro's Jenpeg Generating Station while Sipiwesk Lake is just downstream of Cross Lake. Lake Winnipeg Regulation and the operation of Jenpeg Generating Station both have an influence on water level and flow conditions through these two lakes.

In 1985 an Ecological Monitoring Program under the auspices of the Northern Flood Agreement was initiated to investigate and document the possible impact of hydro development on fish populations within the Churchill River Diversion and Nelson River Systems. Cross and Sipiwesk lakes were two of the six lakes chosen for annual sampling.

The purpose of this report is to present the fish population data collected from Cross and Sipiwesk lakes in 1988 in a form that will make it readily and more easily available for future reference.

METHODS

Fish samples were collected with standard gangs of gillnets. These gangs consisted of various mesh sizes as follows: 1.5", 2.0", 3.0", 3.75", 4.25" and 5.0" stretched measure. Each net was 22.9 m (25 yd) long and 1.8 m (6 ft) deep. In Cross Lake an additional panel (5.25 inch mesh size) was added to the standard gangs in order to simulate a previous study by Gaboury and Patalas (1981). Gillnet sets were set on the bottom and overnight for 16 - 20 h duration.

Fork length and round weight measurements were recorded for all fish caught. Sex and state of maturity were recorded and ageing structures were taken from the principal commercial fish species of lake whitefish, cisco, walleye, sauger and northern pike. Ageing structures were collected as follows: otoliths and first three pectoral fin rays from whitefish and cisco, otoliths and first three dorsal spines from walleye and sauger and the left cleithrum and first three pectoral fin rays from northern pike.

In this study, Cross lake was divided into two separate basins. This was consistent with the study by Gaboury and Patalas (1982) who felt the eastern basin of Cross Lake held a different population of fish to that of the west basin. Consequently, Cross Lake was treated as two lakes (West Cross and East Cross) and two samples of fish were produced.

Summaries and growth curve analysis were performed by the same methods as described by Patalas (1984) and Kirton (1985).

RESULTS

Sampling areas and netting locations for the 1988 program remained consistent with previous years in Sipiwesk Lake (Figs. 1-4) and fairly consistent in Cross Lake (Figs. 5-9). A total of 43 sets were made in Sipiwesk Lake from June 13 - July 16 (Table 1), 17 sets were made in West Cross Lake from August 12-24 (Table 2) and four sets were made in East Cross Lake from August 9-10 (Table 3). The frequency and sequence of locations varied depending upon fishing success, weather and water level conditions.

Most-noteworthy for 1988 was the unusually low water levels found in Cross Lake. Some areas where net sets had been made over the last couple of years were too shallow, weed choked or dry. New netting locations as close to these spots were used in 1988. Number of sets made in 1988 increased over previous years in Whiskeyjack Basin (Fig. 7) and decreased in West Cross Middle Basin (Fig. 8) and East Cross Lake (Fig. 9). Only four sets in 1988 compared to the usual 14-23 sets from previous years in East Cross Lake could be made because water levels were too low for navigation or setting nets.

Catch-per-unit-effort remained highest in East Cross Lake, (Table 4). It should be noted that Cross Lake (East and West) are fished with 175 yard long net gangs instead of the standard 150 yard lengths in order to simulate a previous study by Gaboury and Patalas (1981). Numbers and total weight of each species caught are given in Tables 5-7. Mesh size effects on the various species (Table 8-26) show expected findings, whereby fish caught in progressively larger meshes

tend to be older and larger in size. Age class percent frequencies from the total column of Tables 8-21 were used to derive age composition graphs (Figs. 10-16). Whitefish age compositions between Sipiwesk and Cross Lakes tend to be dissimilar, however sample sizes were also poor. Separate comparisons of age compositions for each species (cisco, walleye and pike) between lakes indicate similar groupings especially for modal cohorts. Species specific fork length frequencies (Figs. 17-22) show less similarities than age compositions from one lake to another. Walleye and northern pike histograms tended to have similar composites when compared between lakes. Fork length frequencies were also constructed for non quota species (suckers, etc.) where fish numbers were adequate.

Age specific size and maturity conditions for each sex and sexes combined are given in Tables 27-40. Information from these tables was used to derive mortality and survival estimates (Table 44), maturity rate equations (Table 45) and growth curve analysis (Tables 46-48, Figs. 28-31). Figures 28-31 illustrate the von Bertallanfy curve (solid line) and least squares regression power curve line (dashed line) along with respective equations. The solid squares on these figures represent points which were omitted (Walford and Brody analysis) during the derivation of the von Bertallanfy equation.

Length-weight regression are given in Tables 41-43. Correlations were low for longnose sucker and freshwater drum from Sipiwesk Lake and are probably a reflection of a small sample size. Checks with lengths and weights found in 1988 from these species fell within the bounds of those sampled in previous years and other lakes.

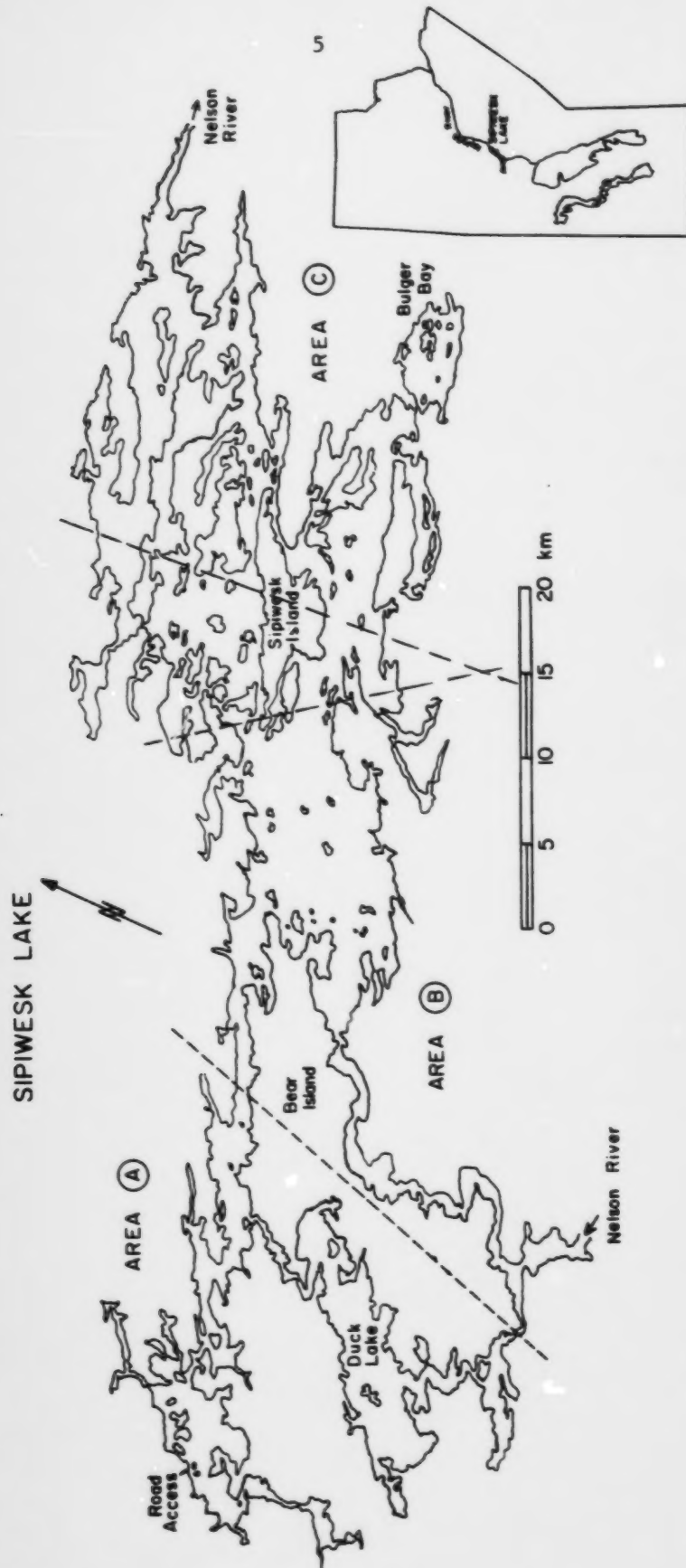


Fig. 1. Map showing location of Sipiwesk Lake and three designated netting areas used in 1988.

Set no.	Depth (m)
11	2
12	5
13	1.5-5.5
14	4.5-6.5
15	6-6.5
16	8-9.5
17	6.5
18	10-9
19	3-4.5
20	2-6
21	7-6.5
22	4.5-8
23	3.5-9

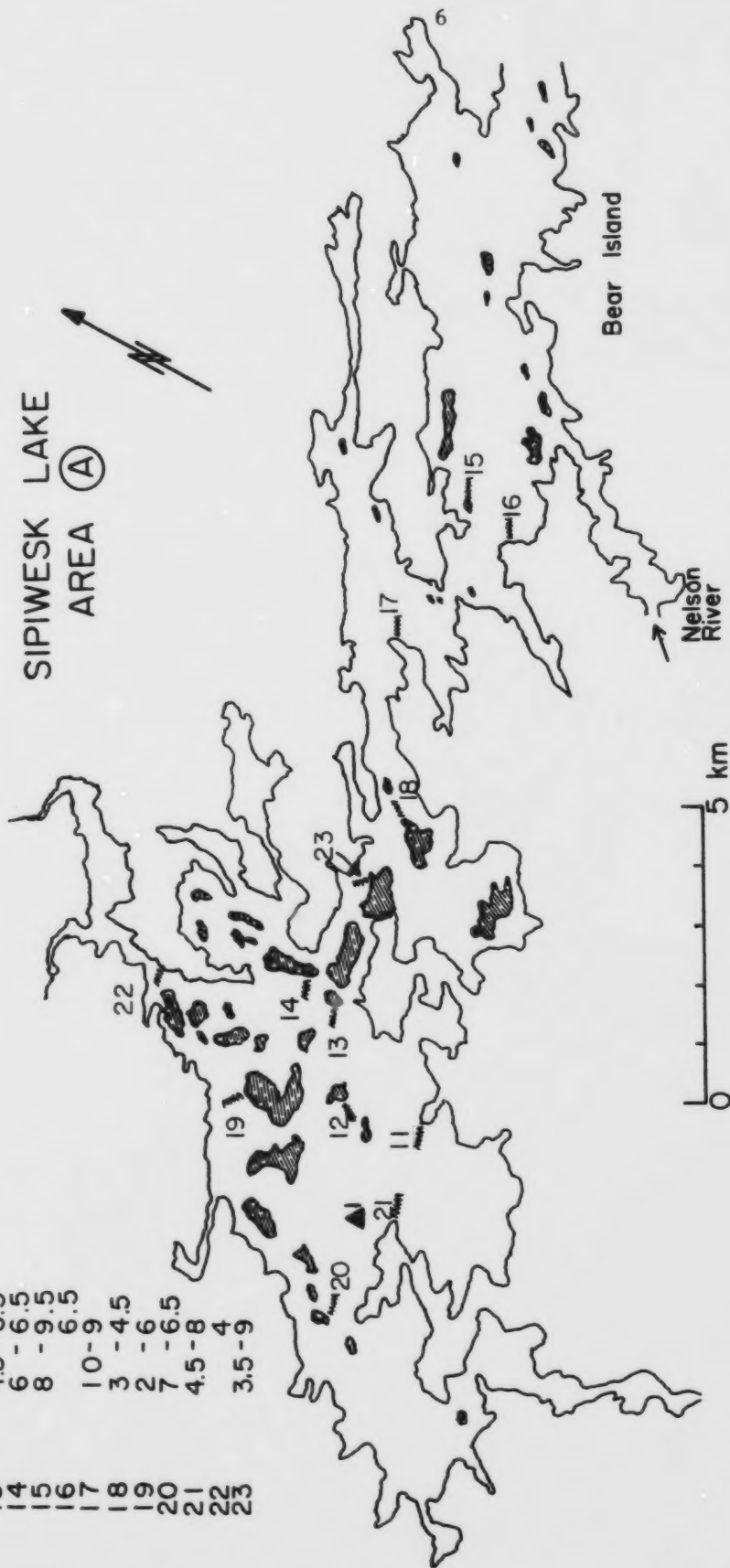


Fig. 2. Netting locations and depths of sets in Area A of Sipiwek Lake, 1988.
▲ 1 = limnological sampling site.

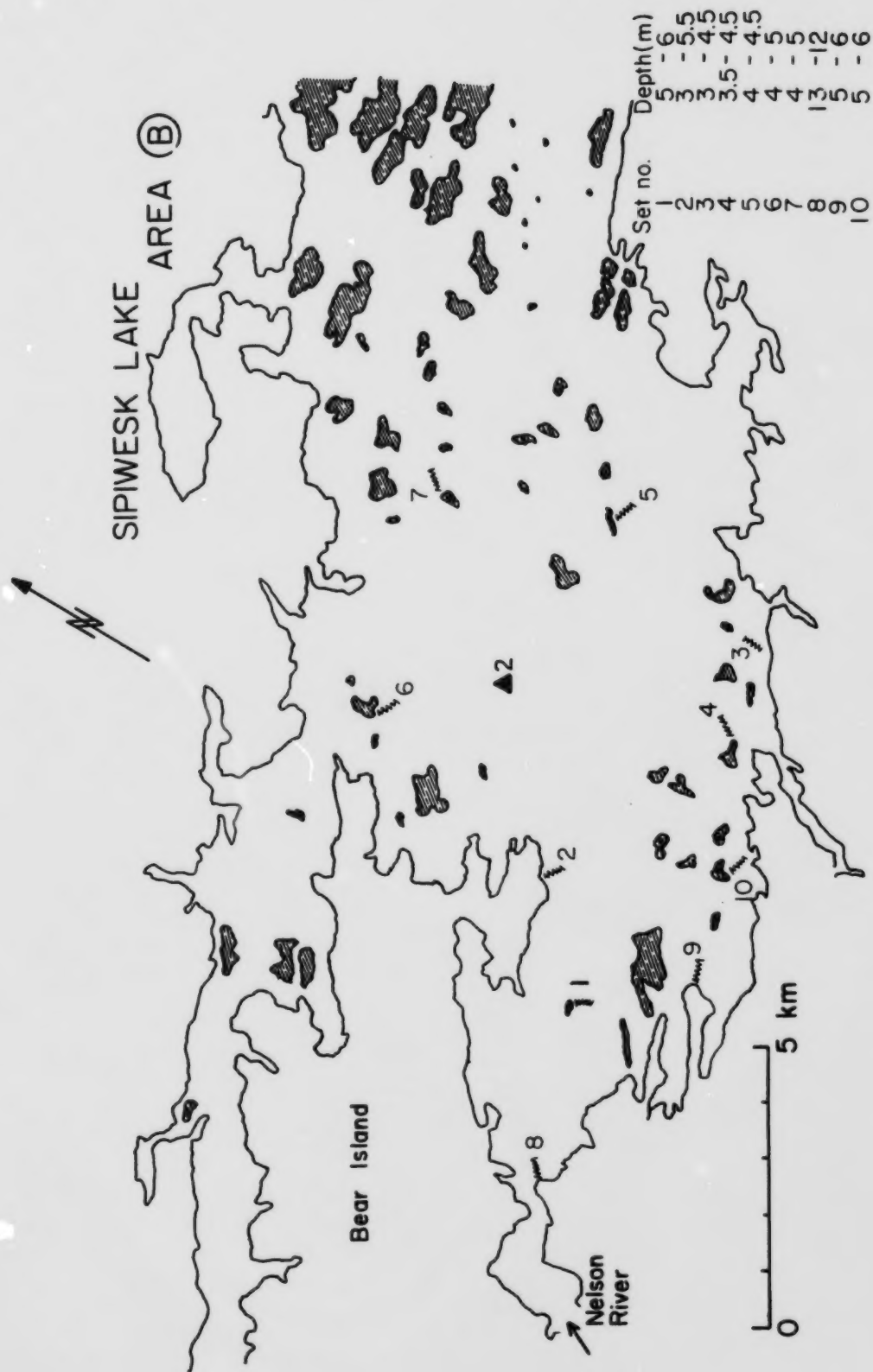


Fig. 3. Netting locations and depths of sets in Area B of Sipiwek Lake, 1988. $\blacktriangle$ 2 = limnological sampling site.

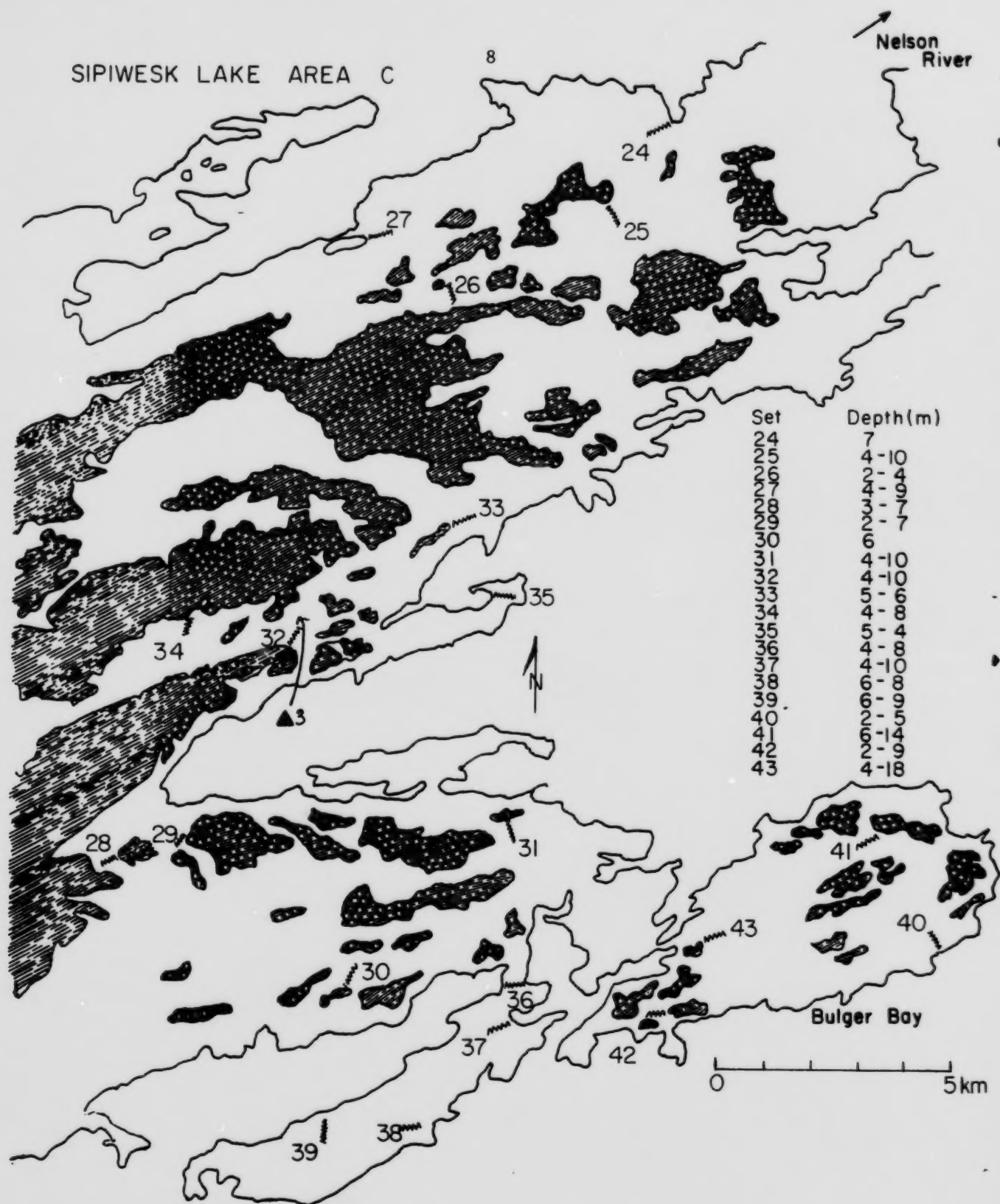


Fig. 4. Netting locations and depths of sets in Area C of Sipiwesk Lake, 1988.
 ▲3 = limnological sampling site.

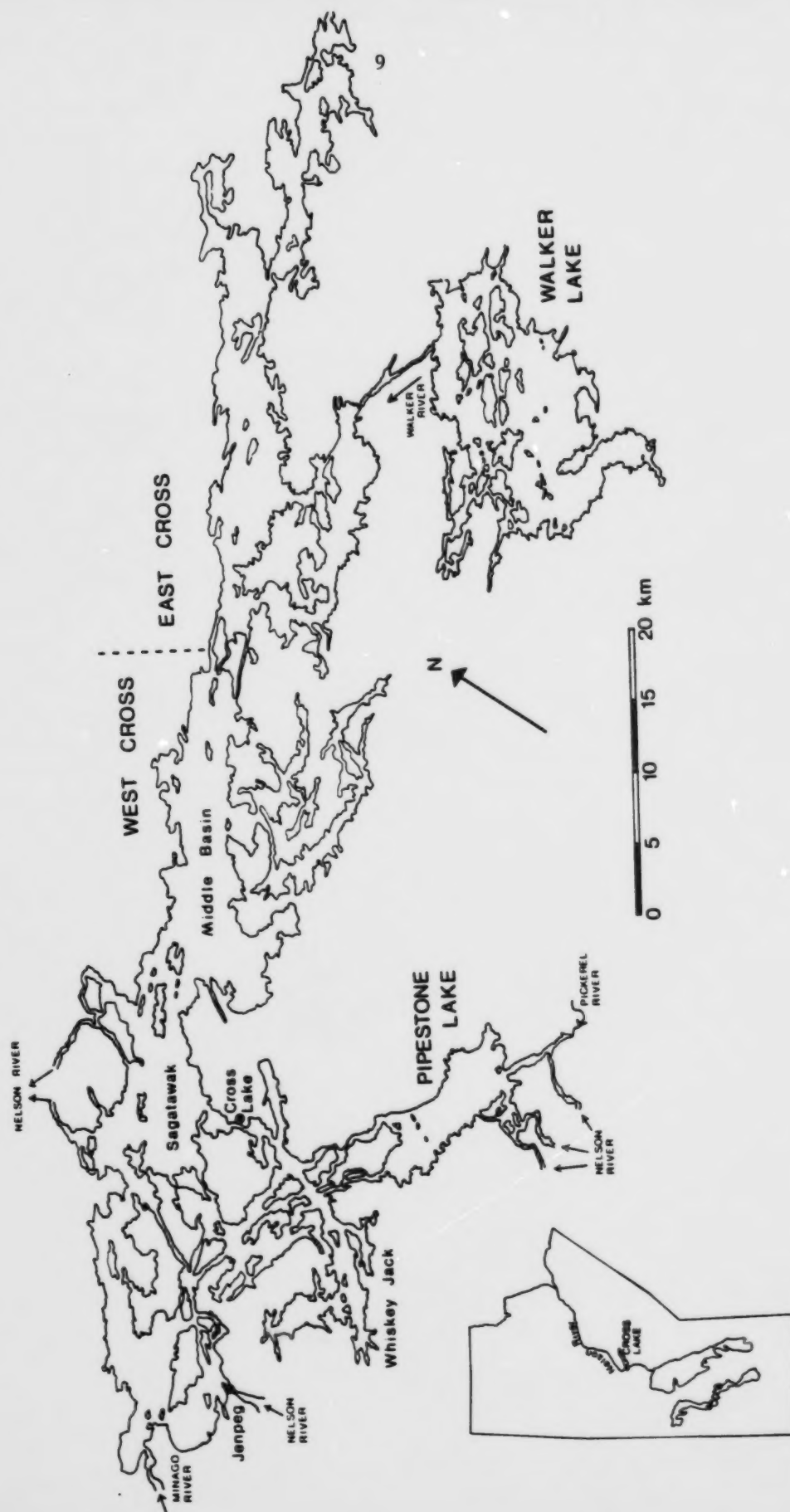


Fig. 5. Map showing location of Cross Lake and designated working areas used in 1988.

CROSS LAKE WEST BASIN

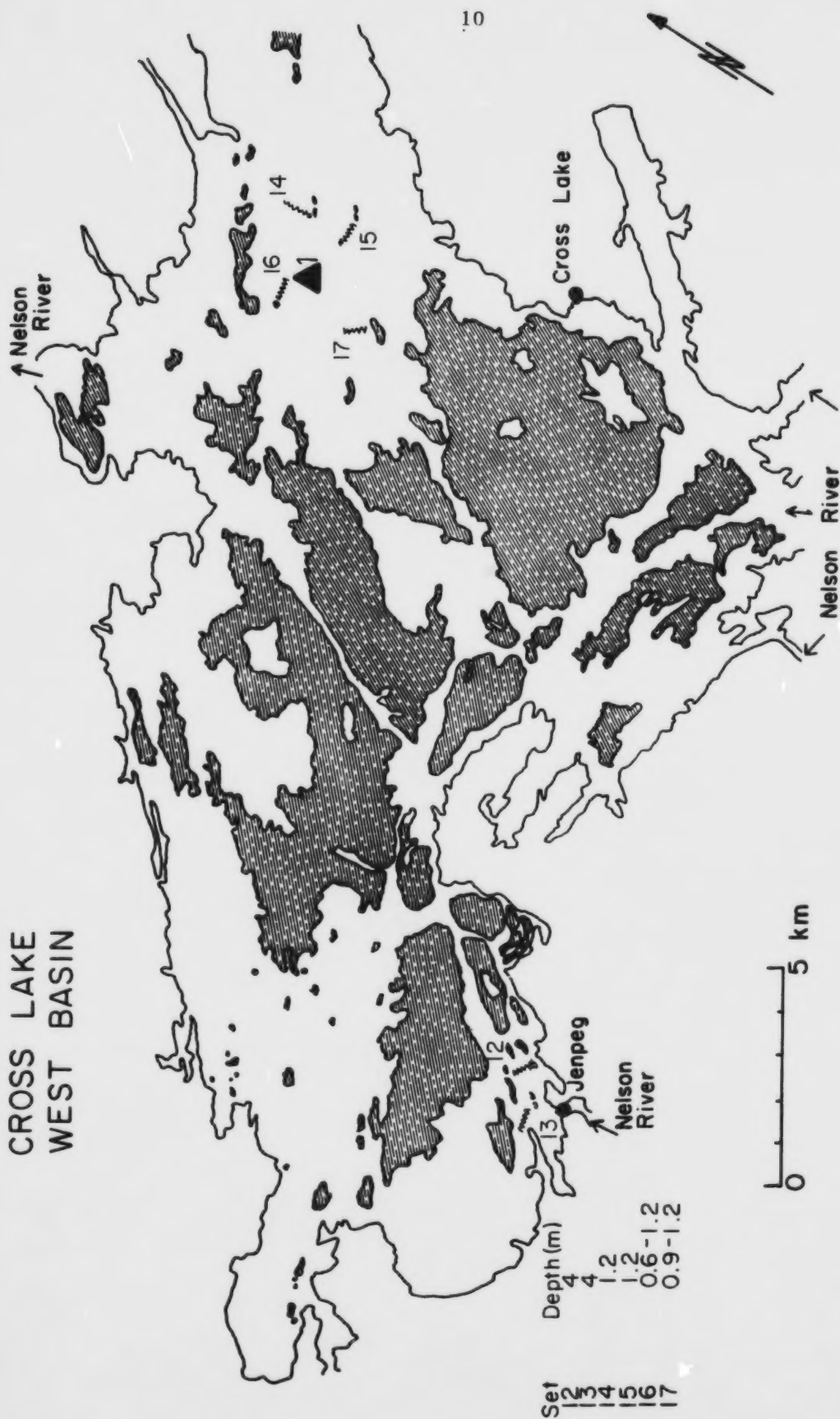


Fig. 6. Netting locations and depths of sets from Cross Lake west basin, 1988. $\blacktriangle$ 1 = limnological sampling site.

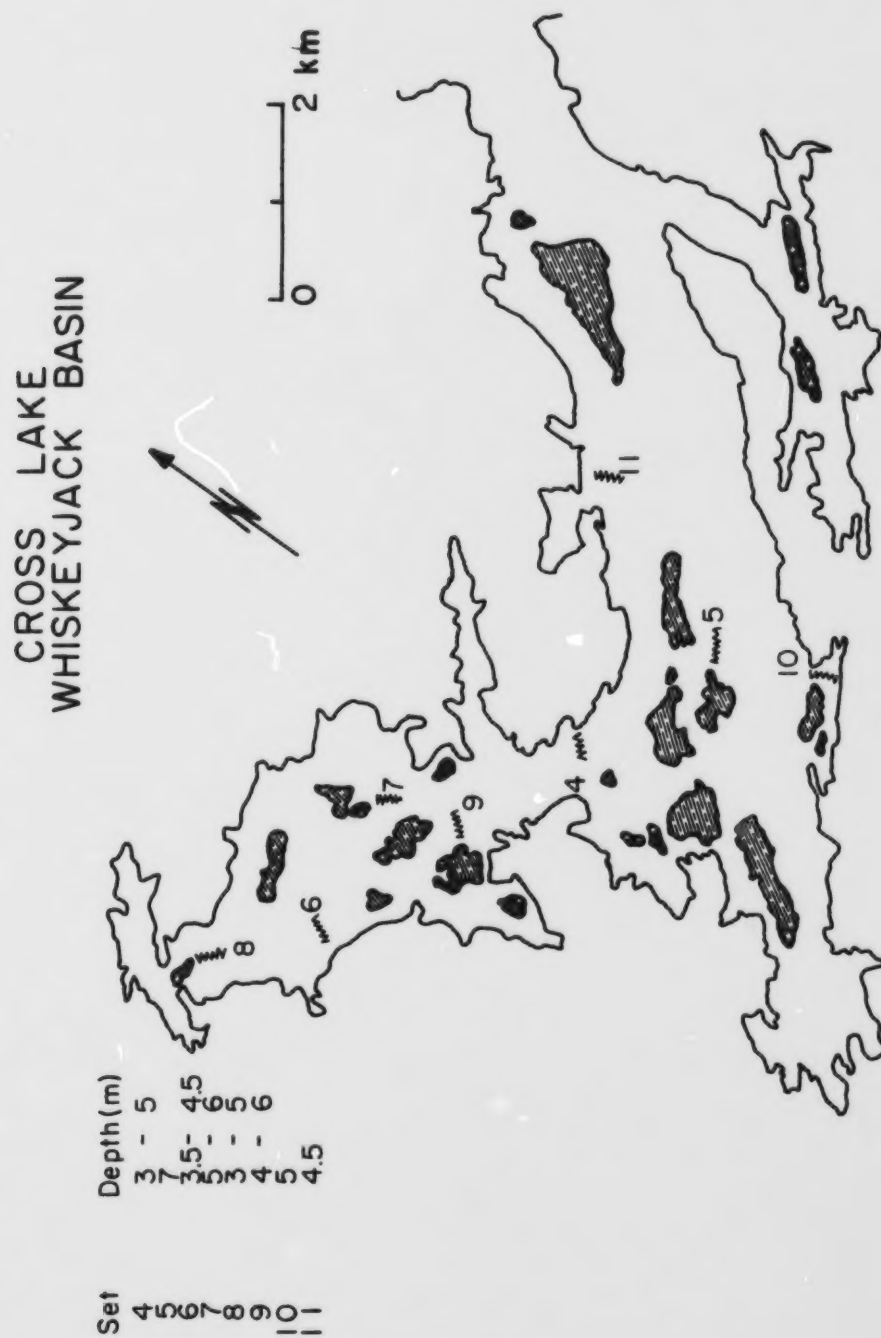


Fig. 7. Netting locations in Whiskeyjack Basin (part of West Cross Lake), 1988.

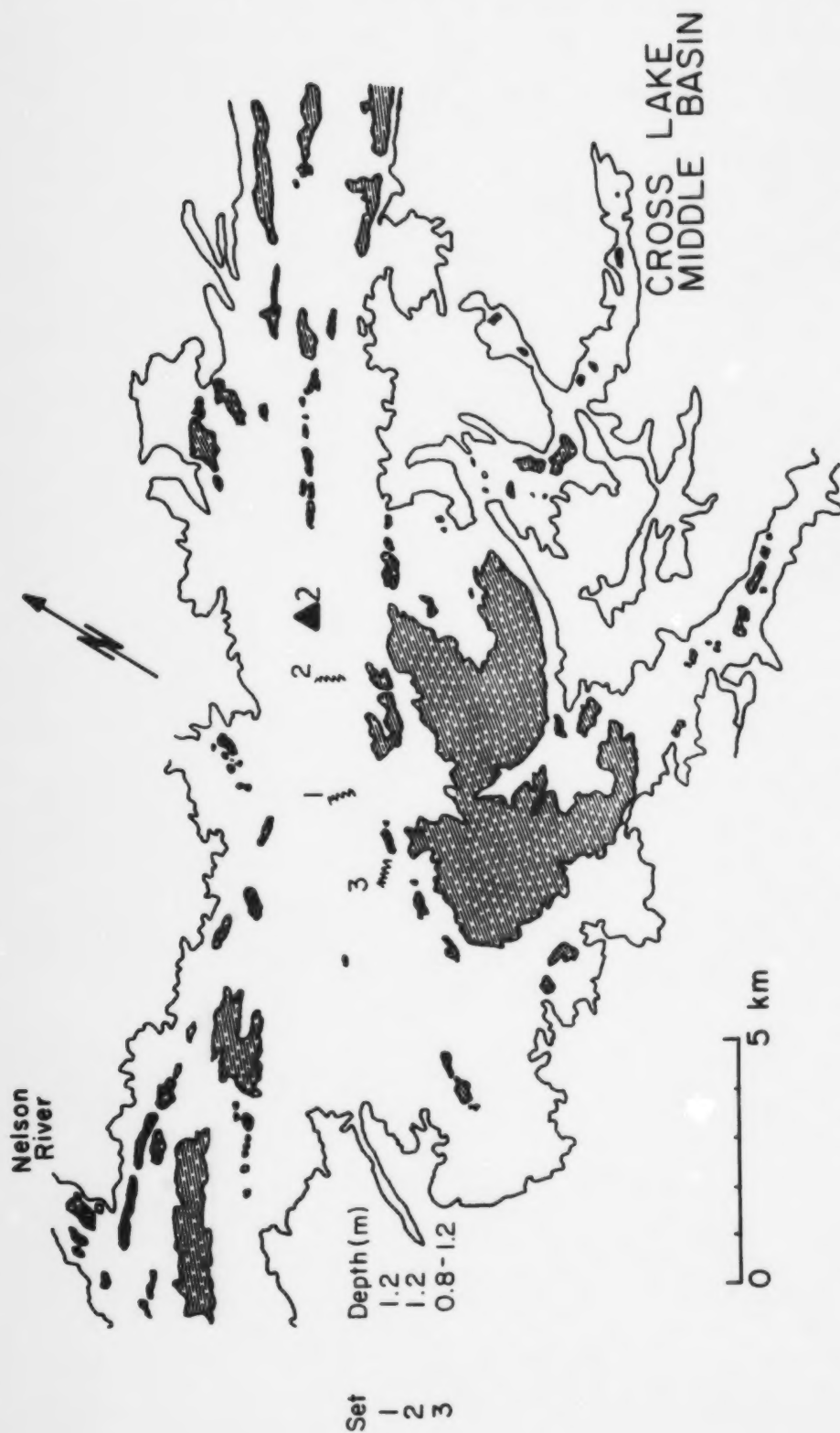


Fig. 8. Netting locations and depths of sets from Cross Lake Middle Basin, 1988.
 ▲2 = limnological sampling site.

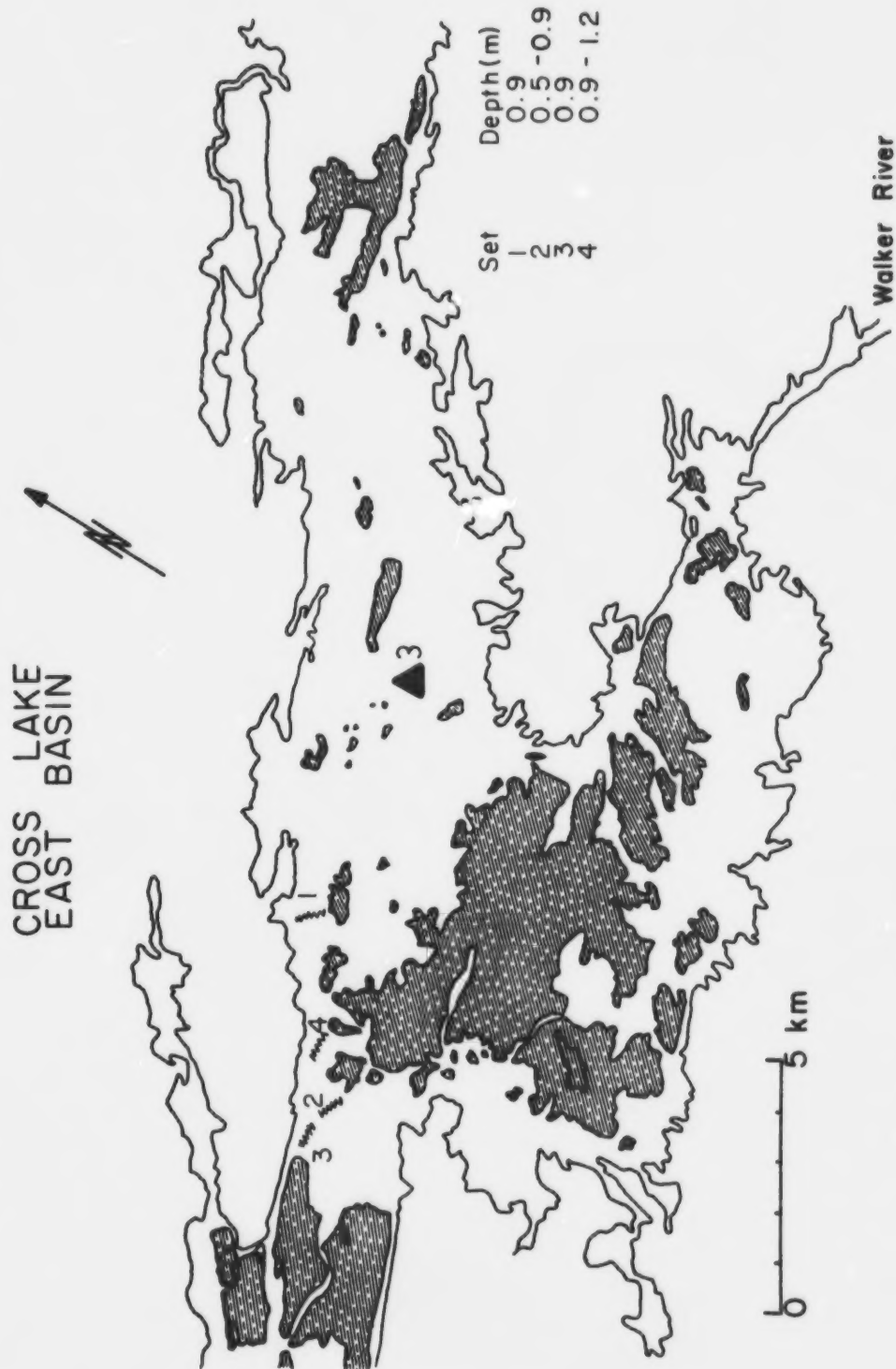


Fig. 9. Netting locations and depths of sets from Cross Lake East Basin, 1988. $\blacktriangle$ 3 = limnological sampling site.

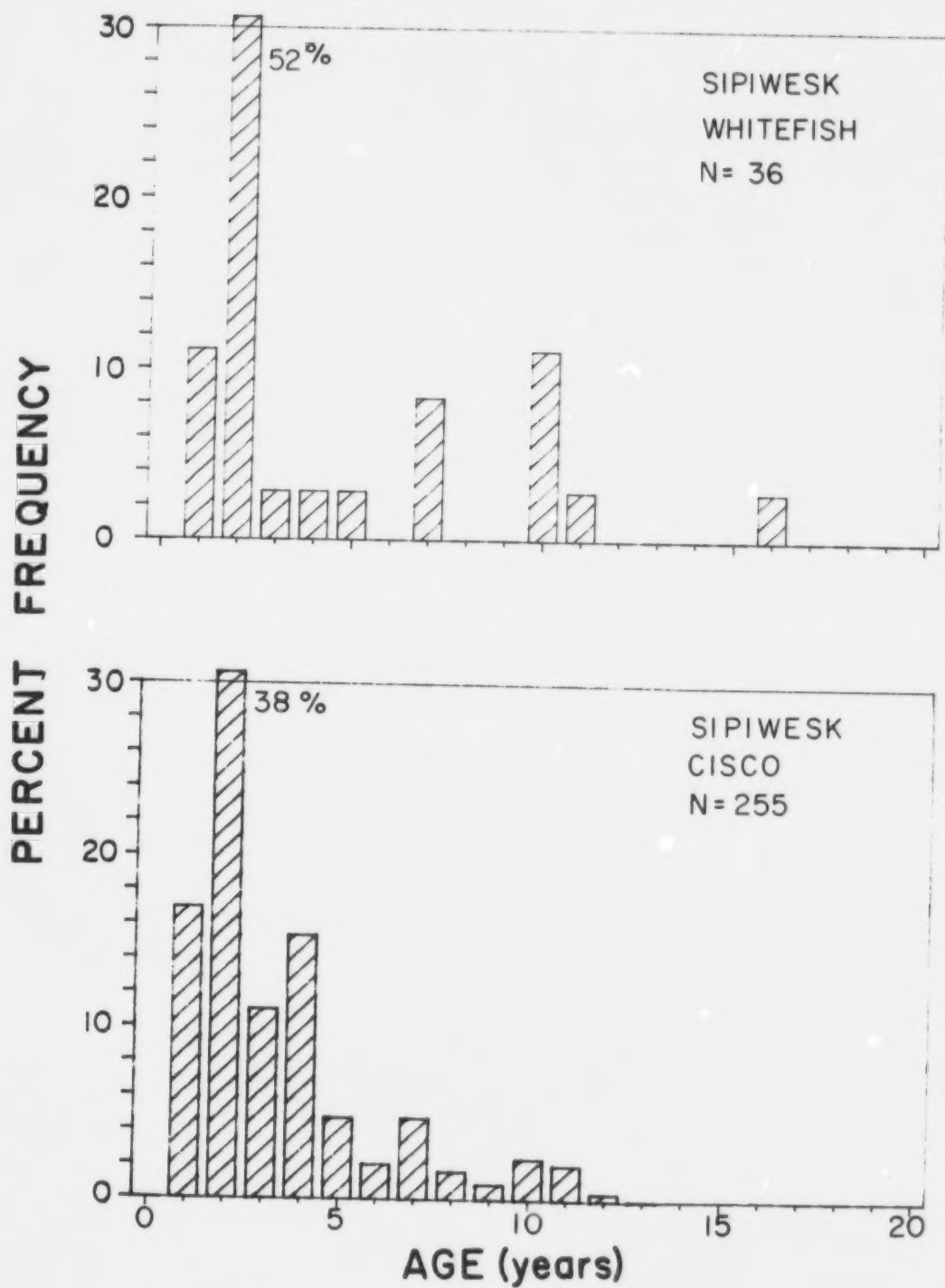


Fig. 10. Age compositions for whitefish and cisco from Sipiwesk Lake, 1988.

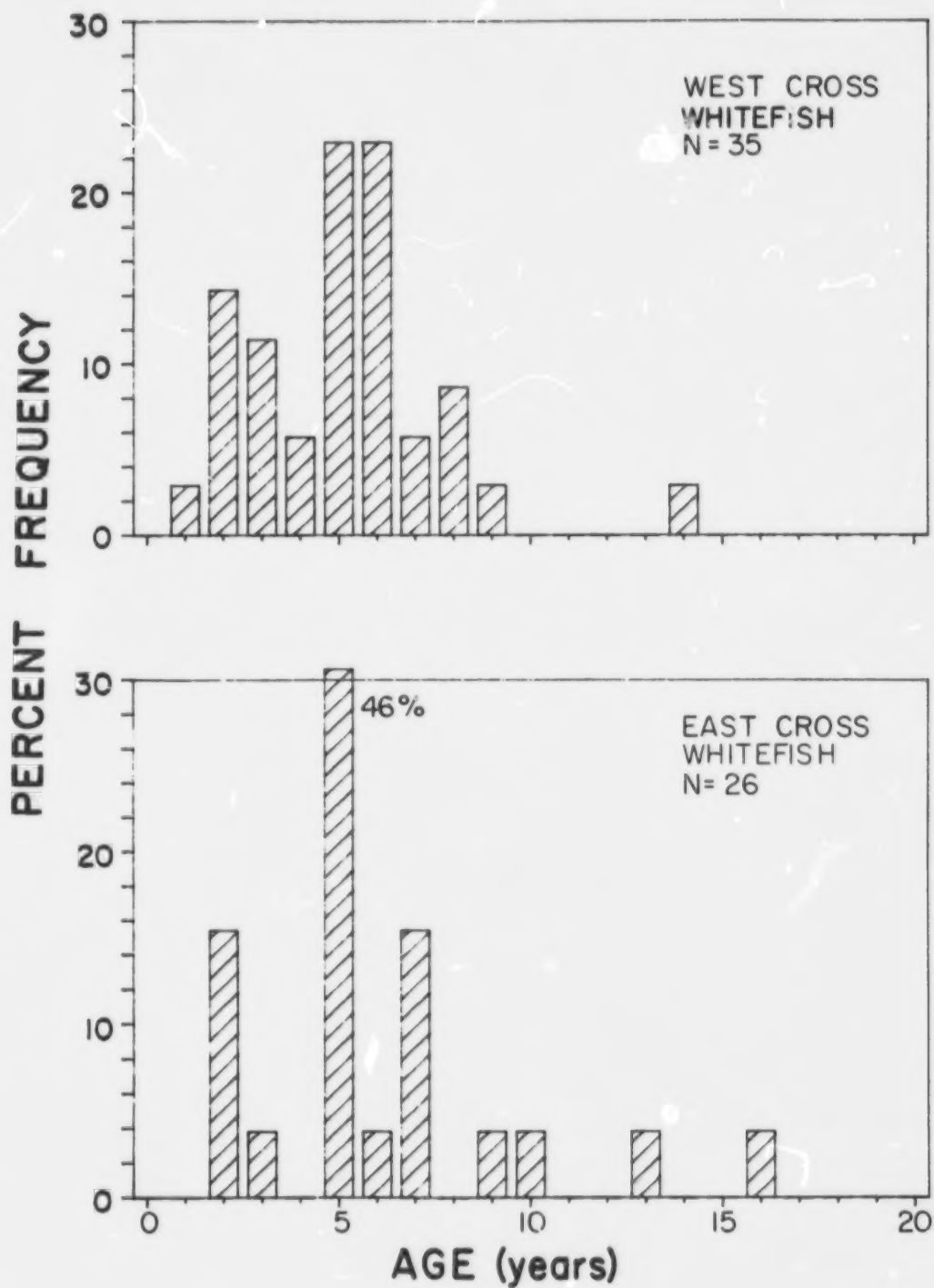


Fig. 11. Age compositions for whitefish from West and East Cross lakes, 1988.

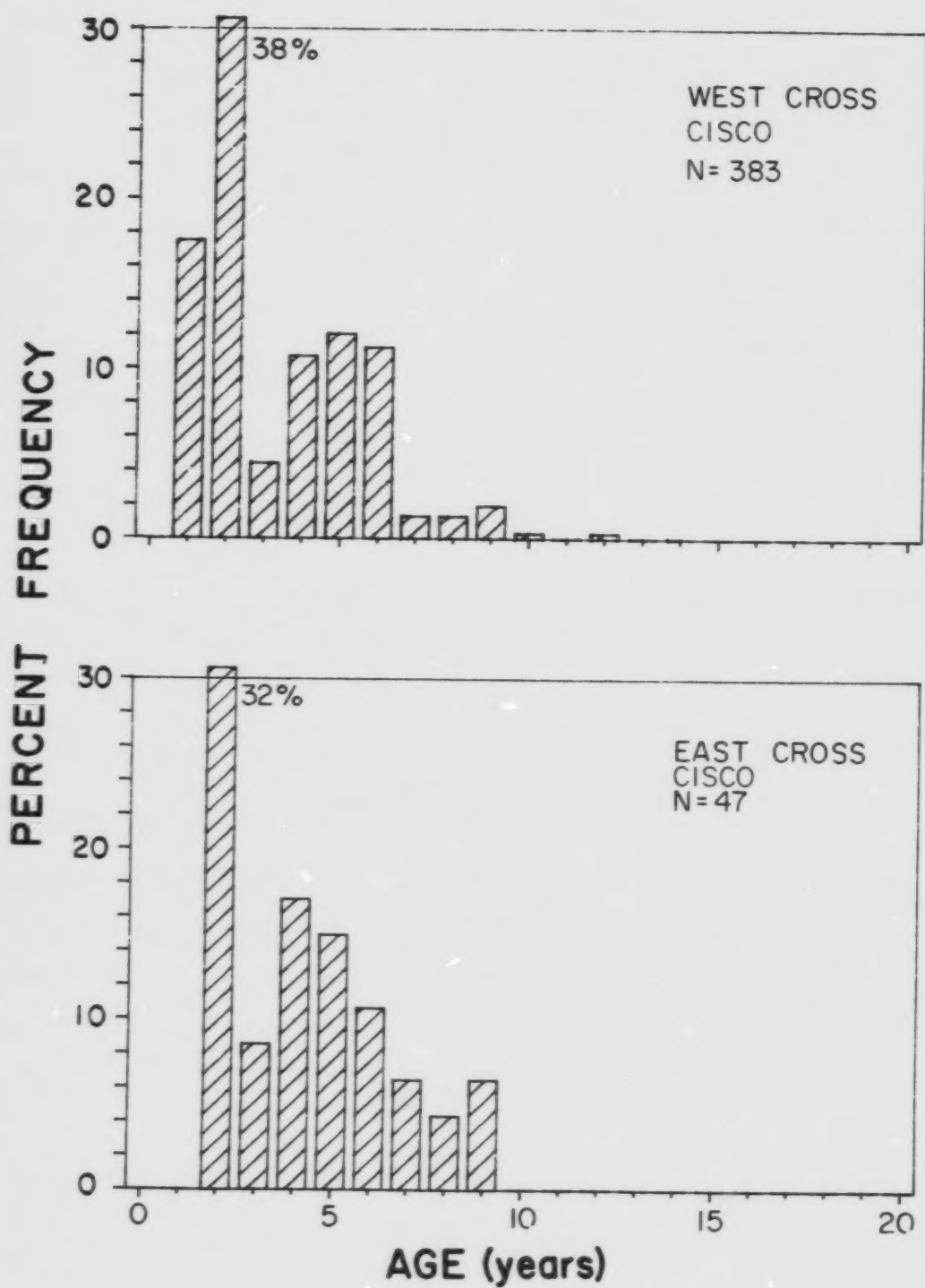


Fig. 12. Age compositions for cisco from West and East Cross lakes, 1988.

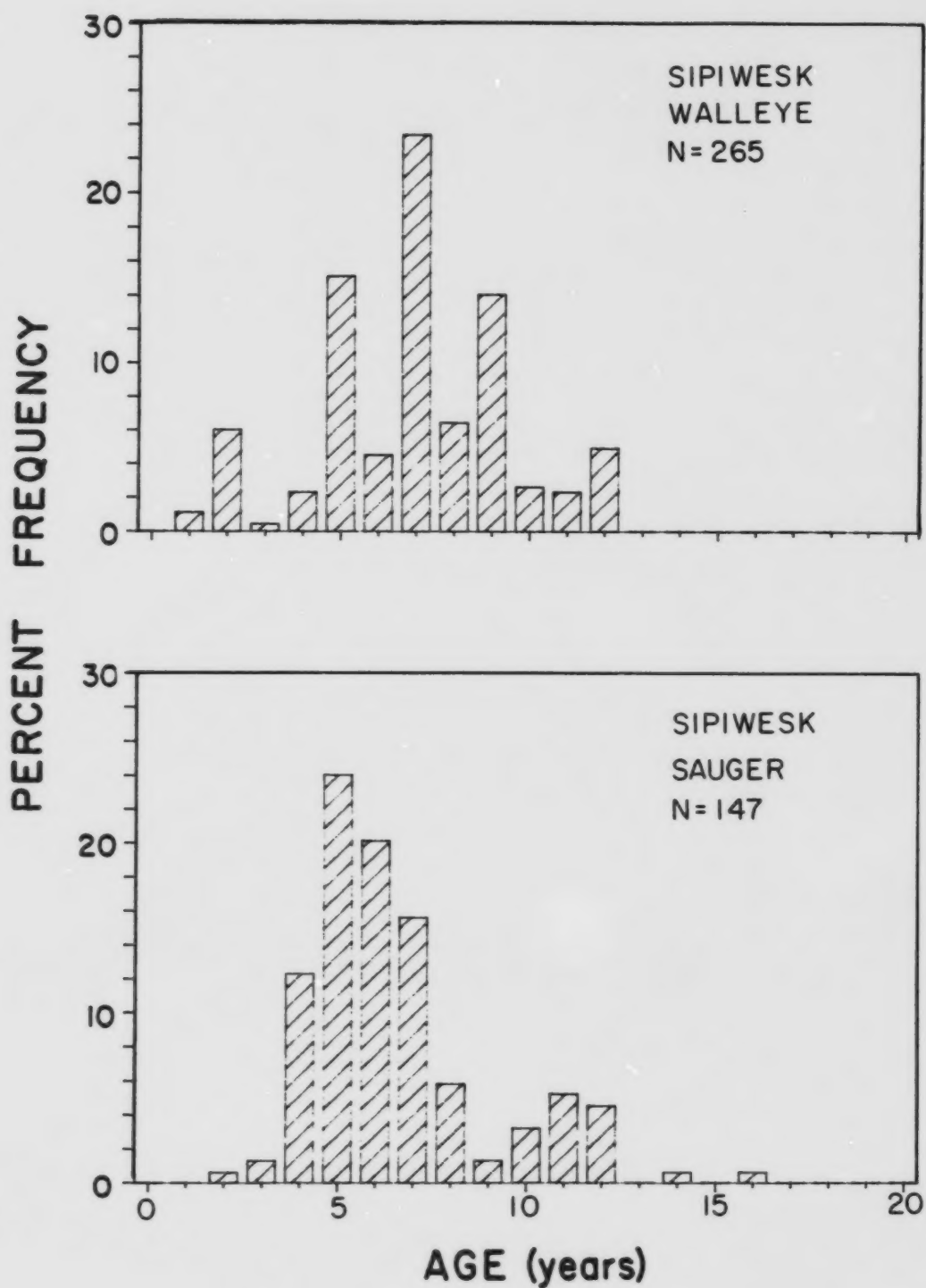


Fig. 13. Age compositions for walleye and sauger from Sipiwesk Lake, 1988.

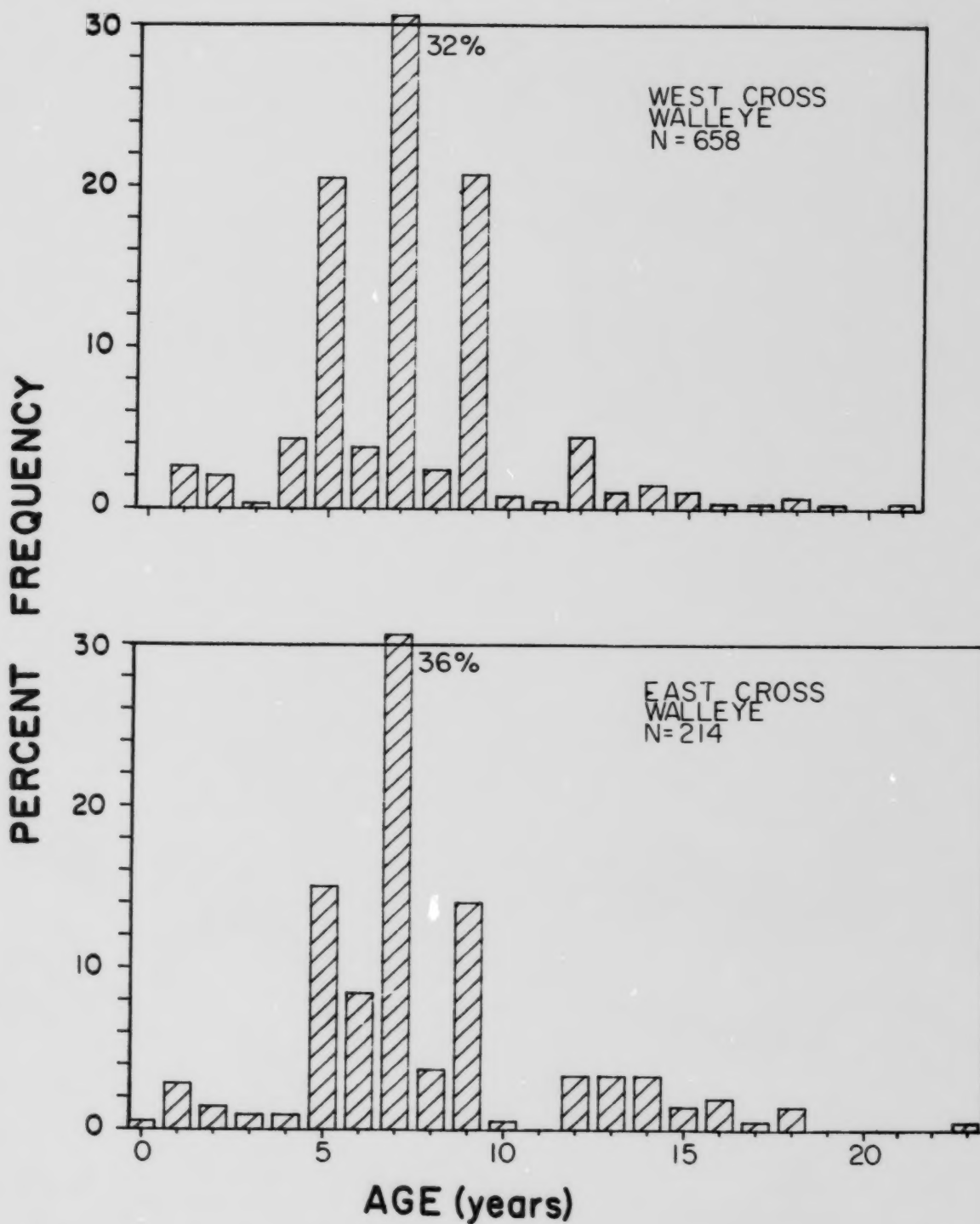


Fig. 14. Age compositions for walleye from West and East Cross lakes, 1988.

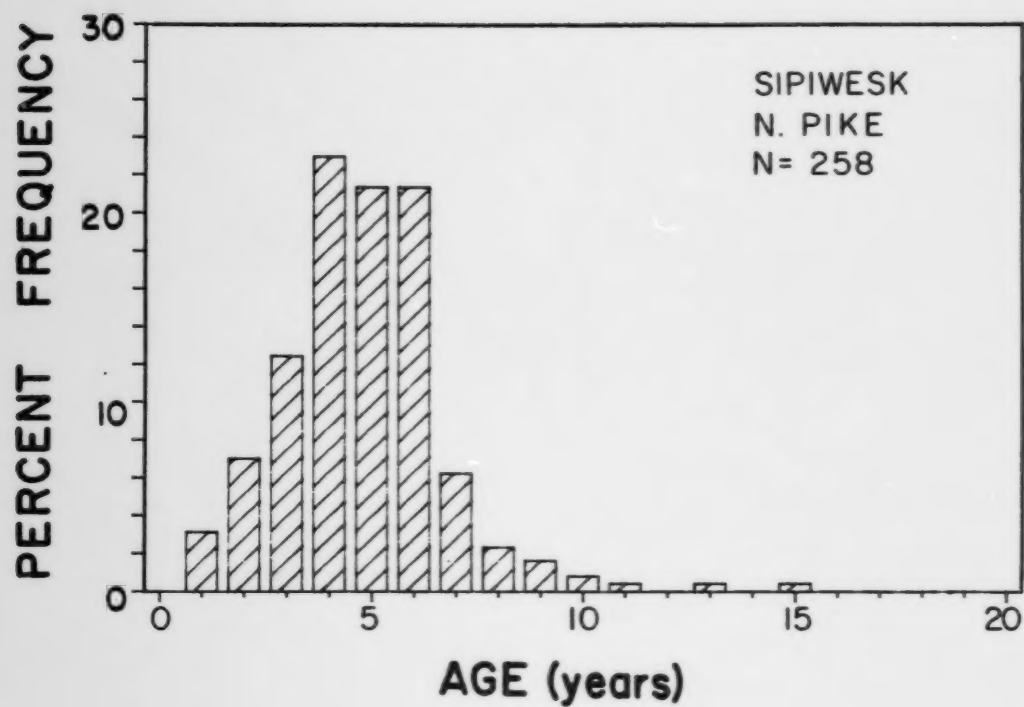


Fig. 15. Age compositions for northern pike from Sipiwesk Lake, 1988.

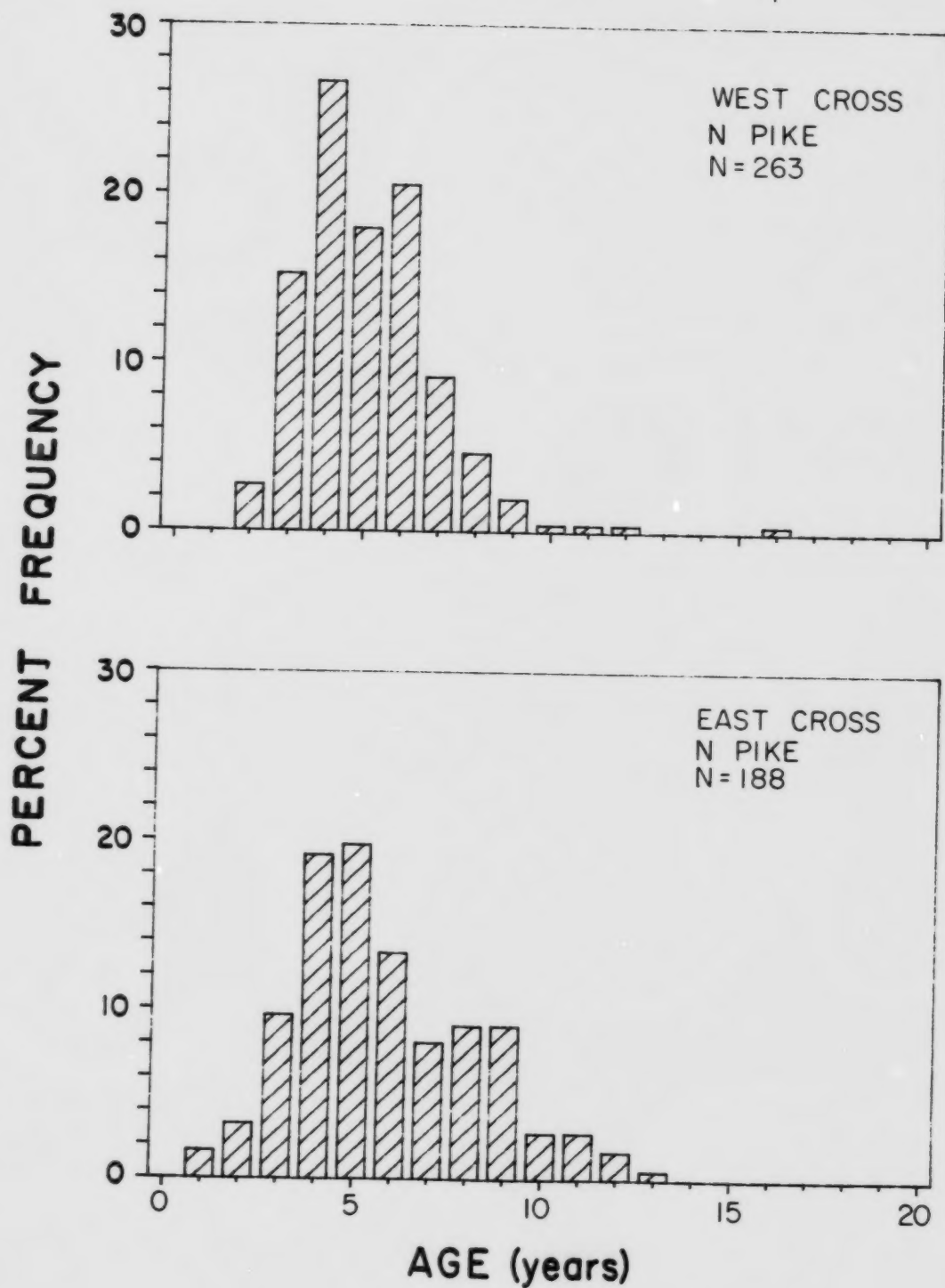


Fig. 16. Age compositions for northern pike from West and East Cross lakes, 1988.

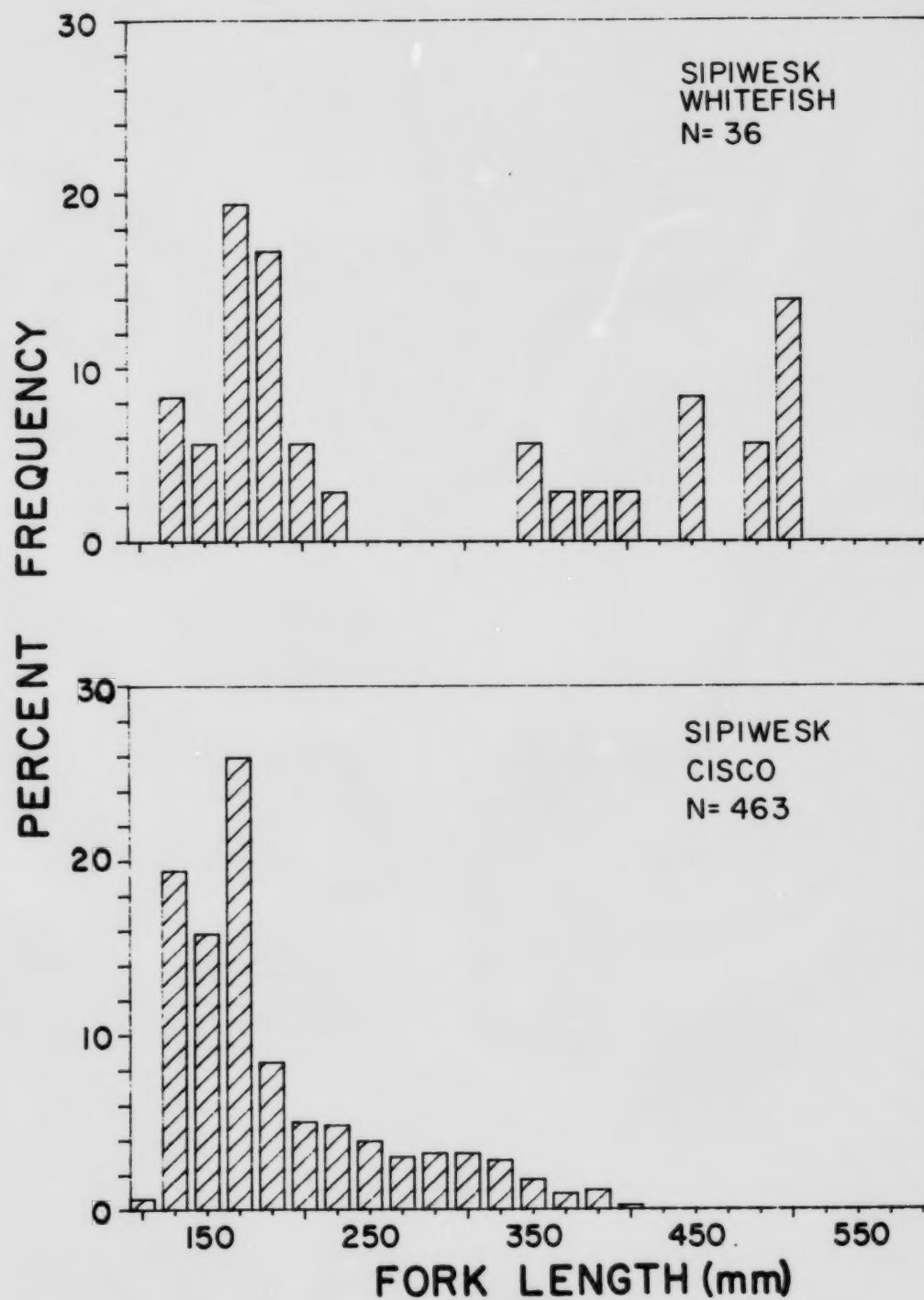


Fig. 17. Fork length frequencies for whitefish and cisco from Sipiwesk Lake, 1988.

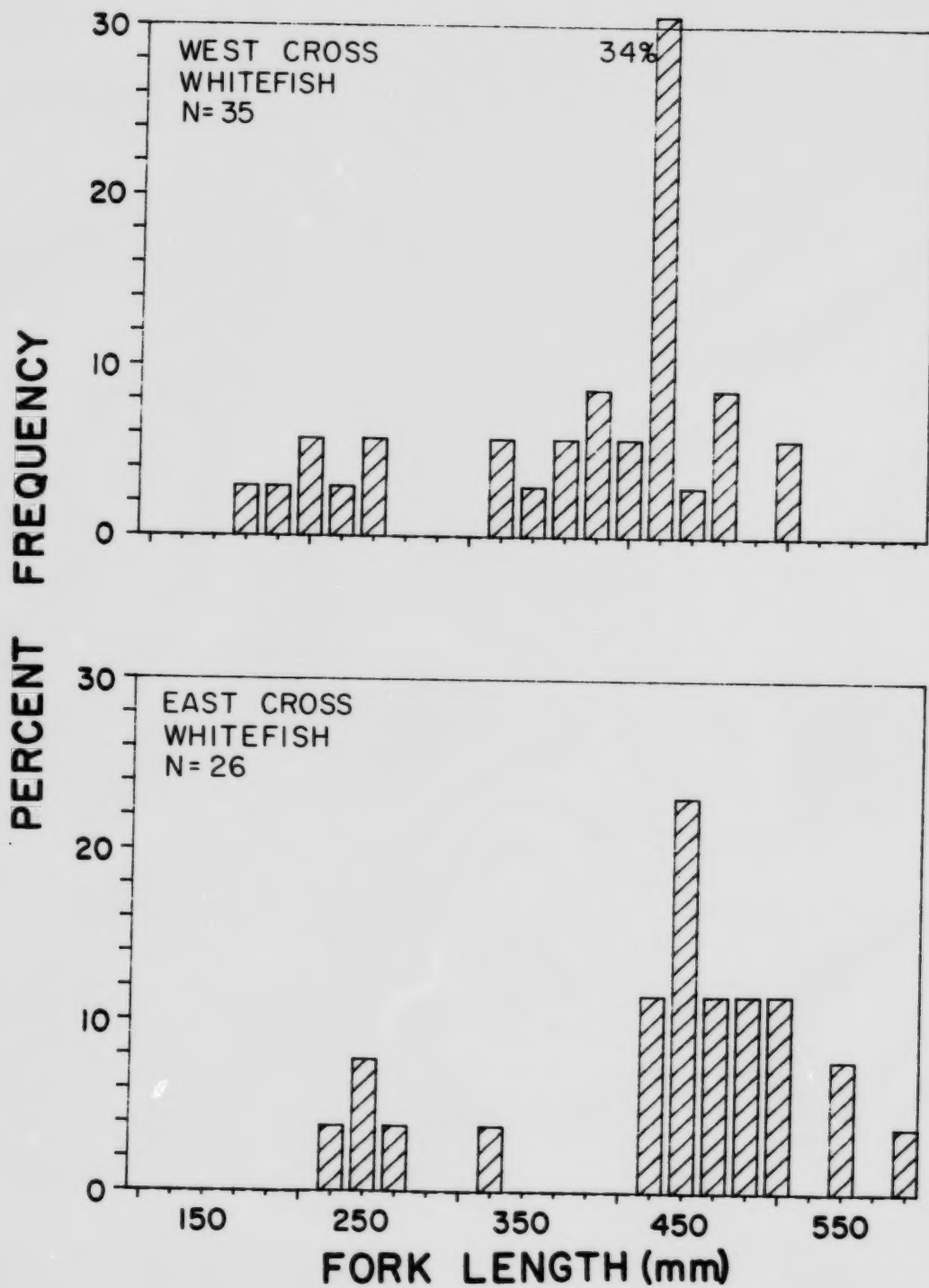


Fig. 18. Fork length frequencies for whitefish from West and East Cross lakes, 1988.

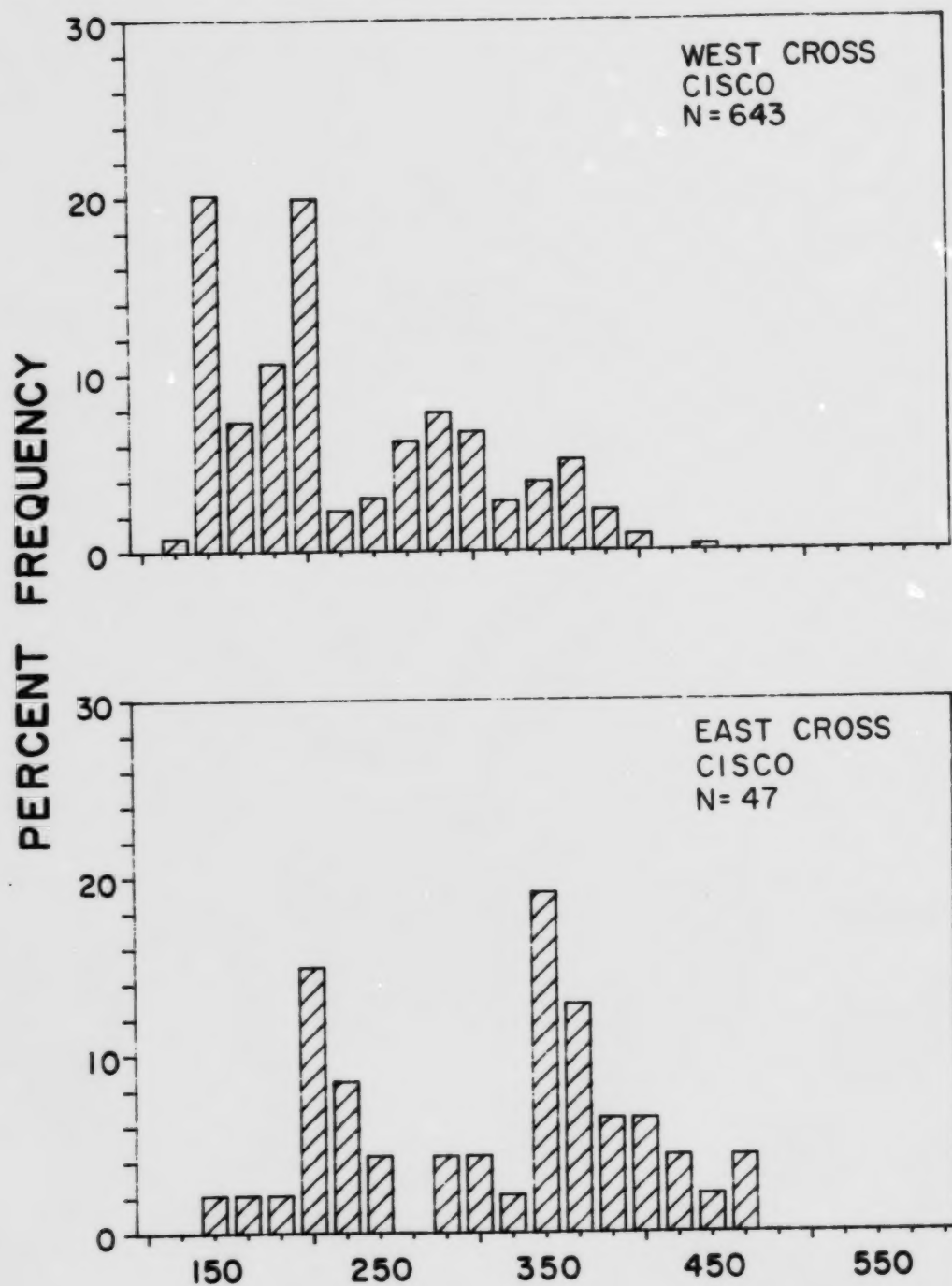


Fig. 19. Fork length frequencies for cisco from West and East Cross lakes, 1988.

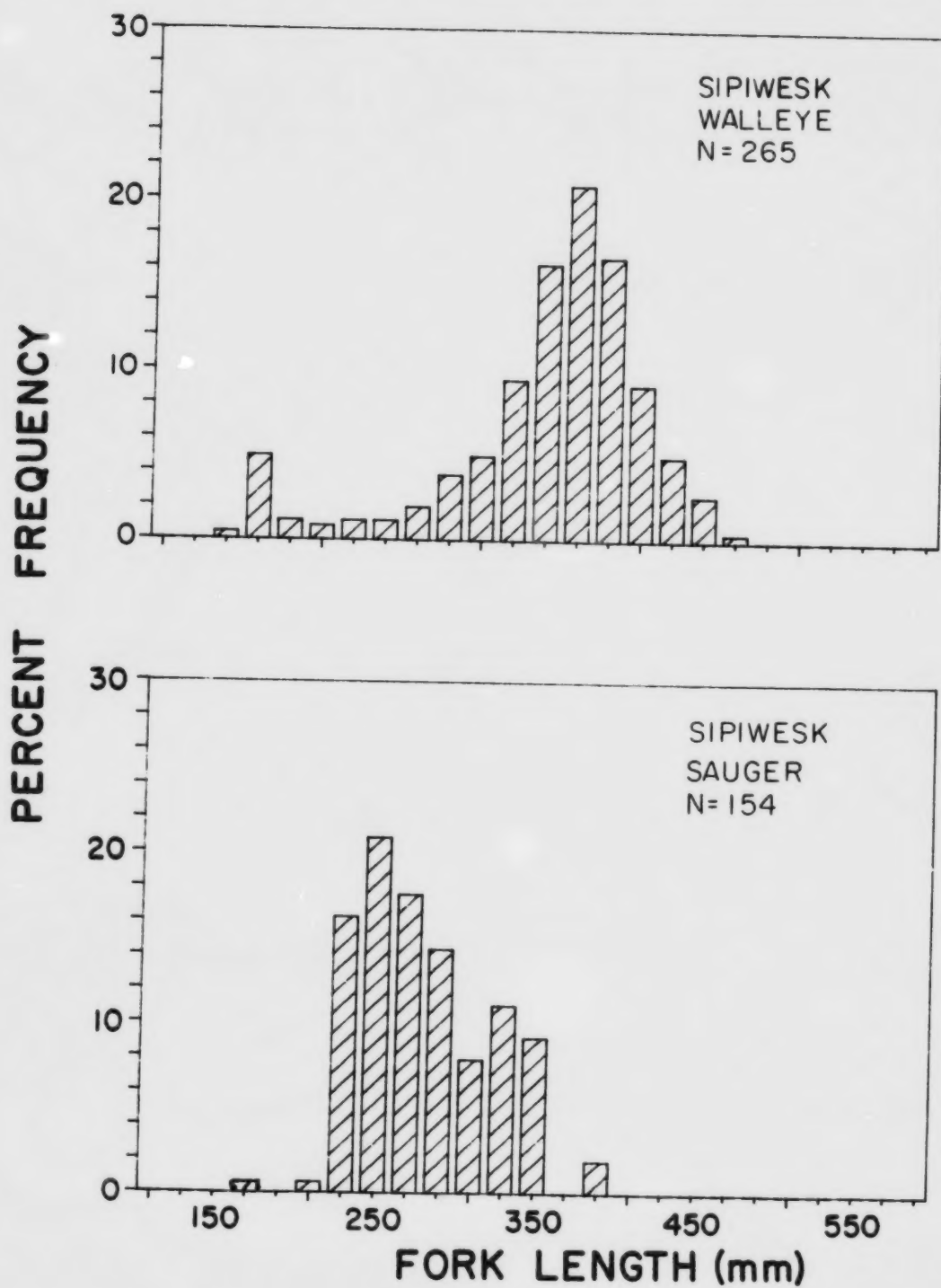


Fig. 20. Fork length frequencies for walleye and sauger from Sipiwesk Lake, 1988..

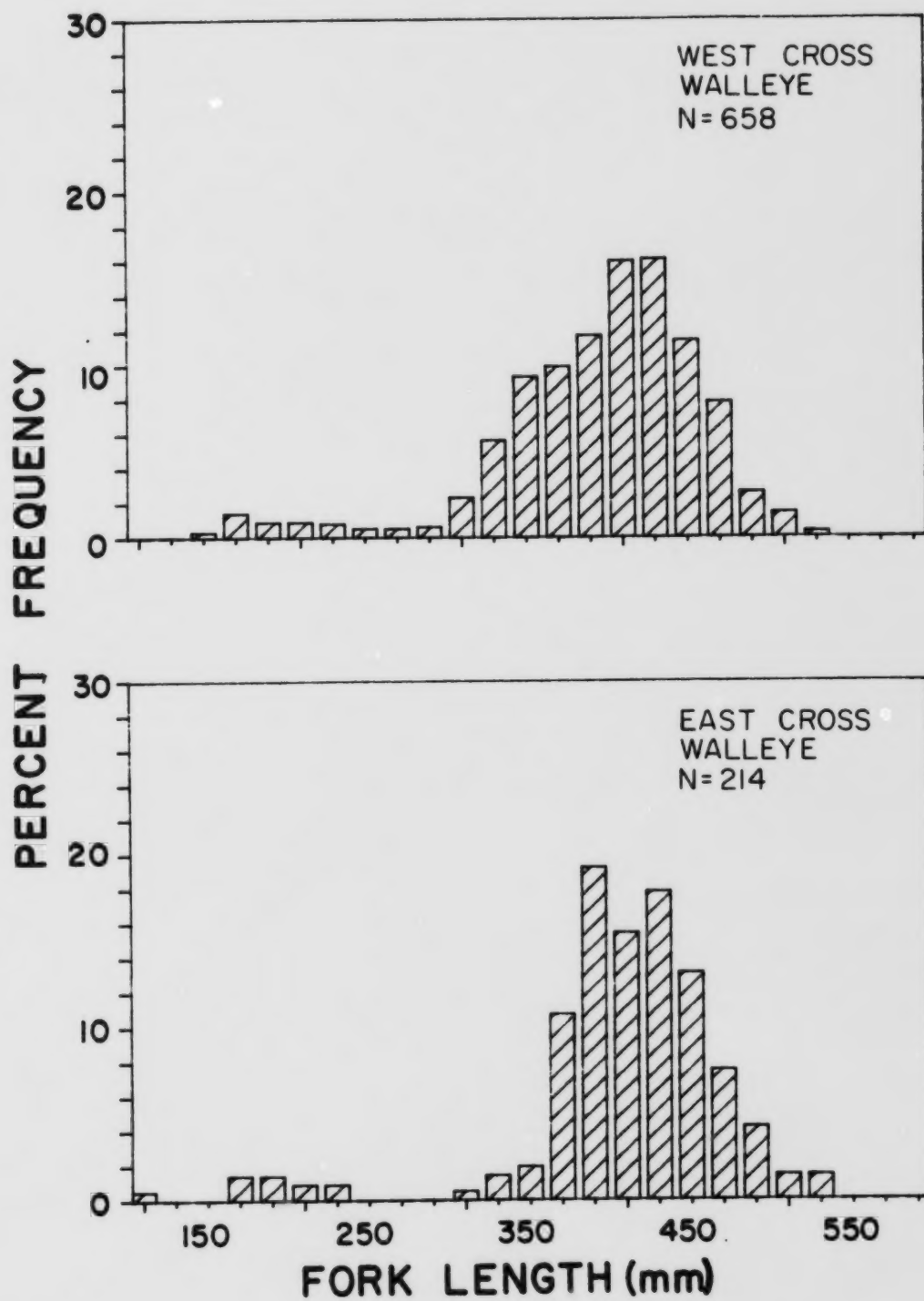


Fig. 21. Fork length frequencies for walleye from West and East Cross lakes, 1988.

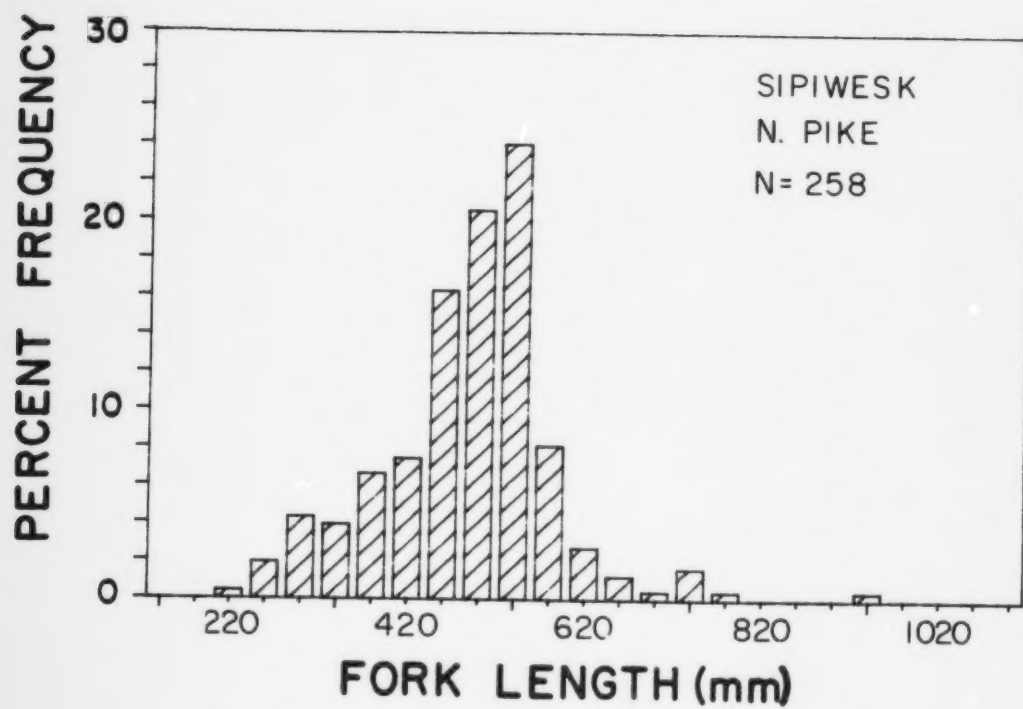


Fig. 22. Fork length frequencies for northern pike from Sipiwesk Lake, 1988.

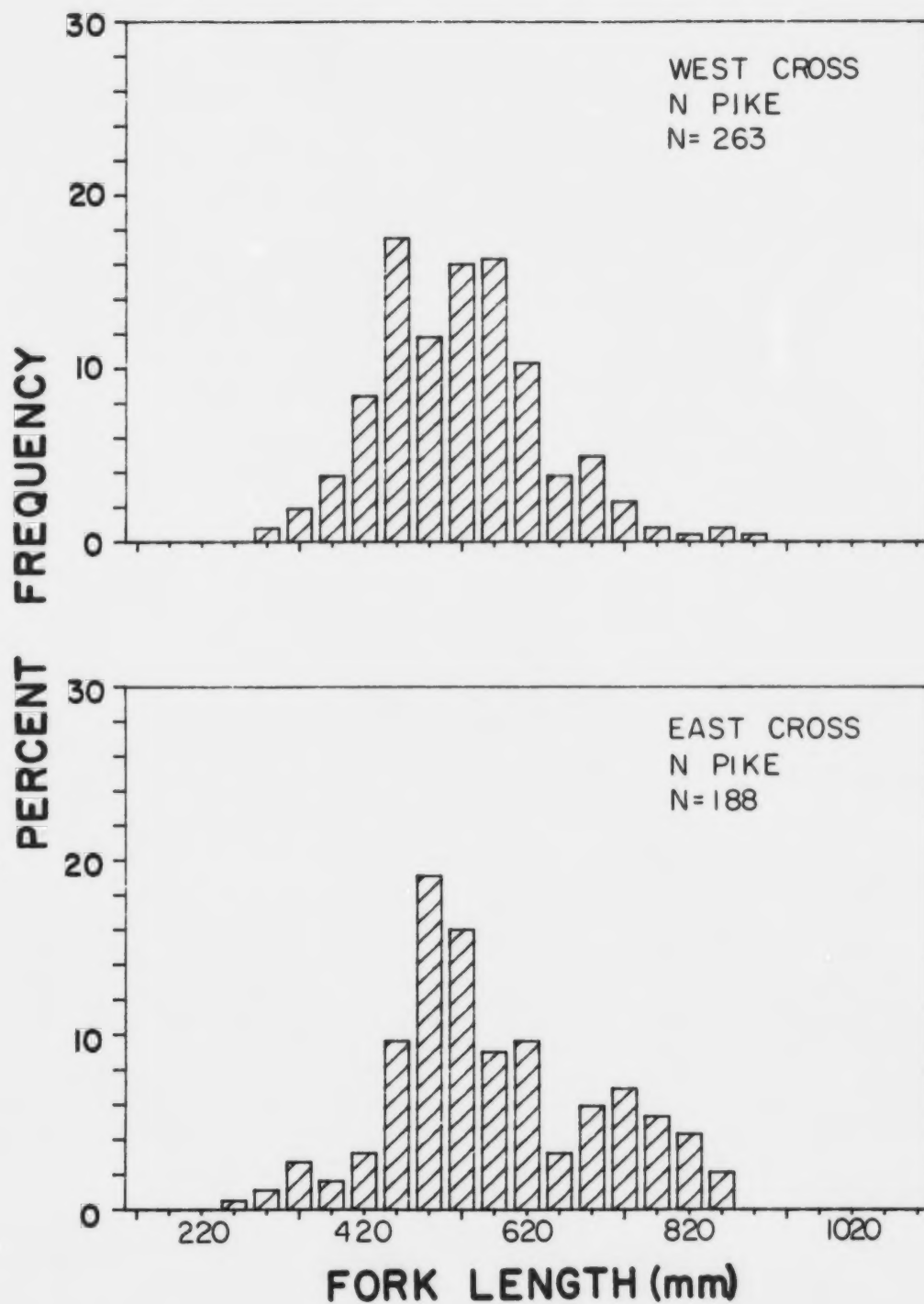


Fig. 23. Fork length frequencies for northern pike from West and East Cross lakes, 1988.

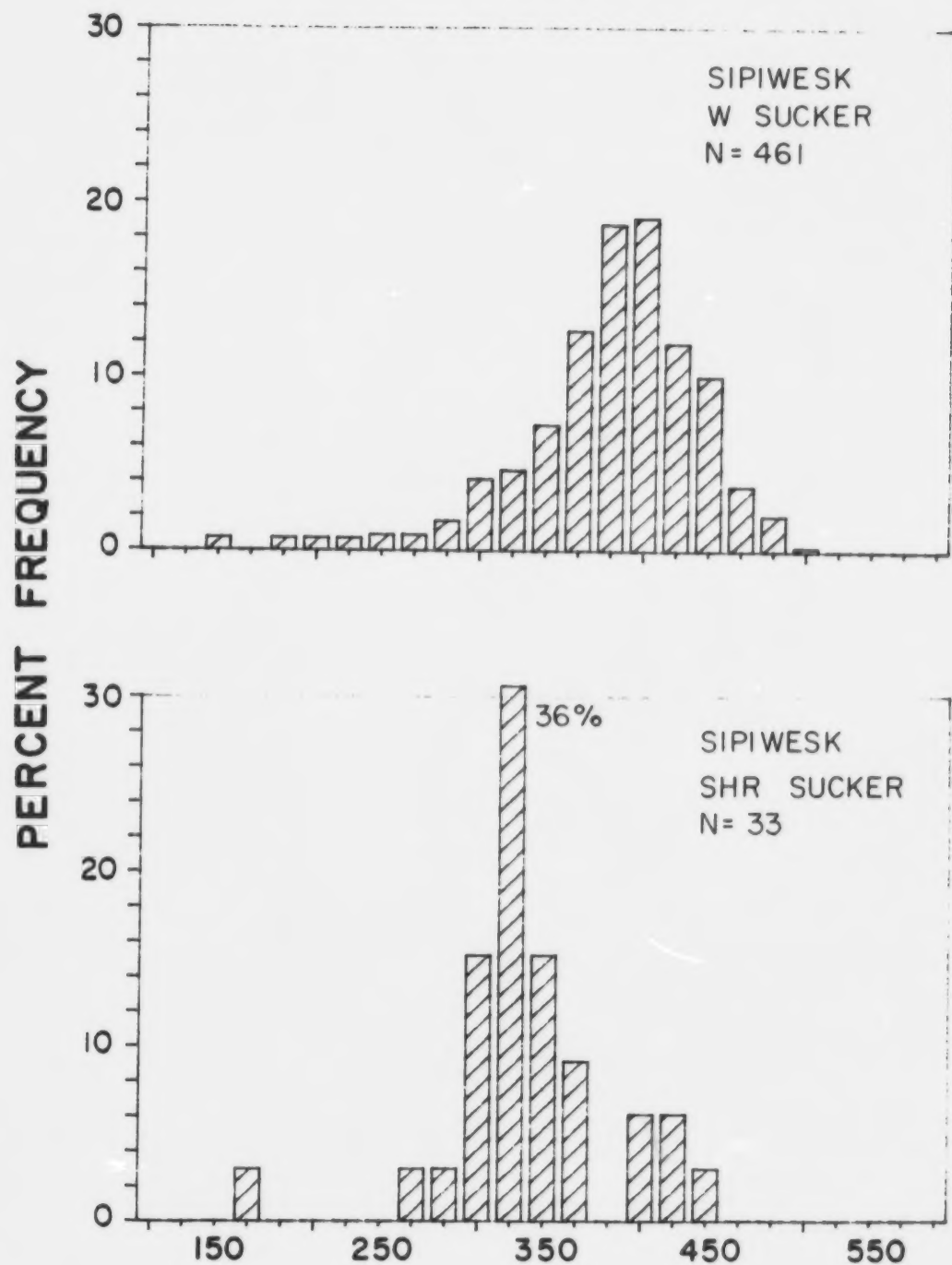


Fig. 24. Fork length frequencies for white sucker and shorthead redhorse sucker from Sipiwesk Lake, 1988.

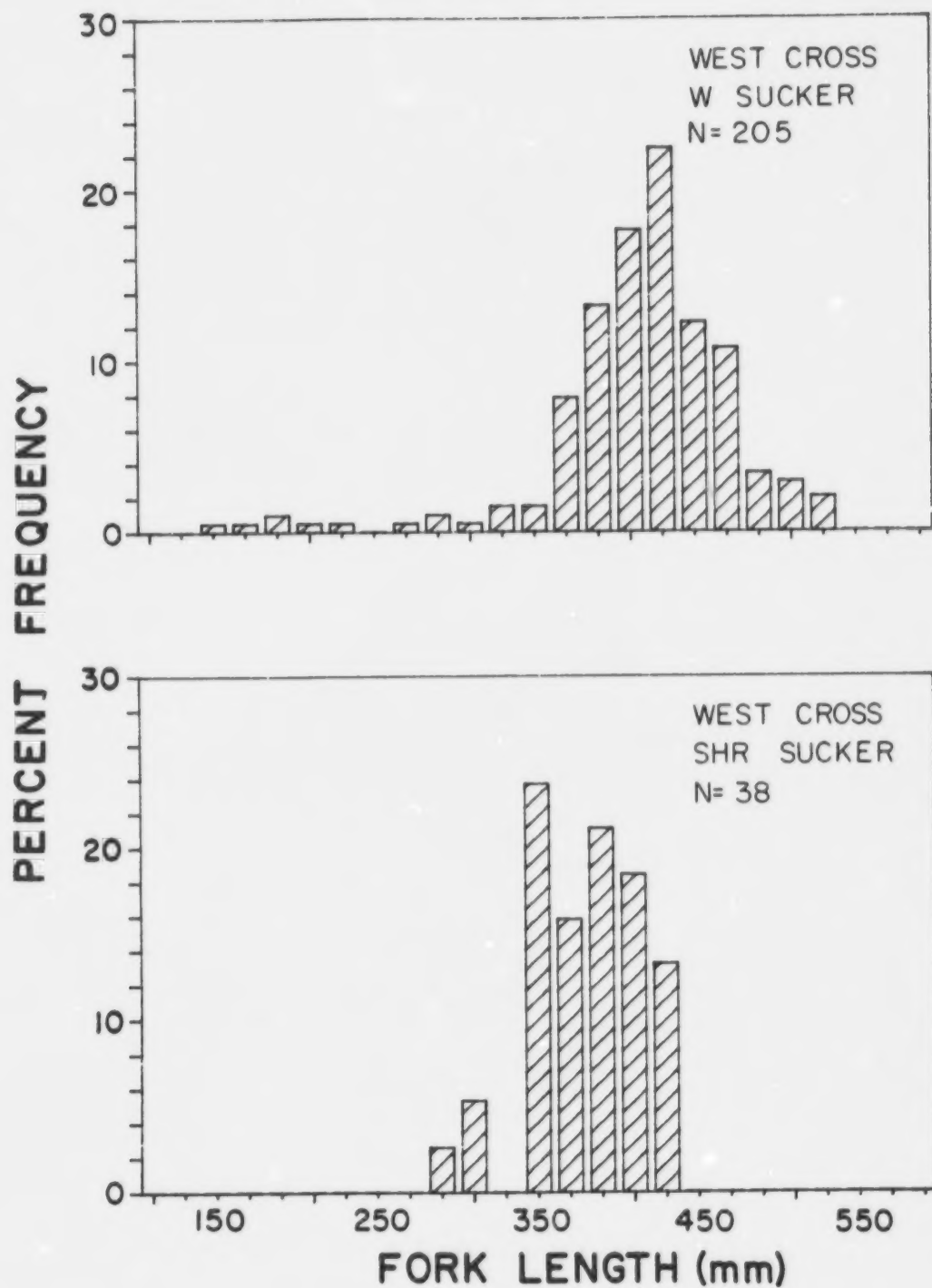


Fig. 25. Fork length frequencies for white sucker and shorthead redhorse sucker from West Cross Lake, 1988.

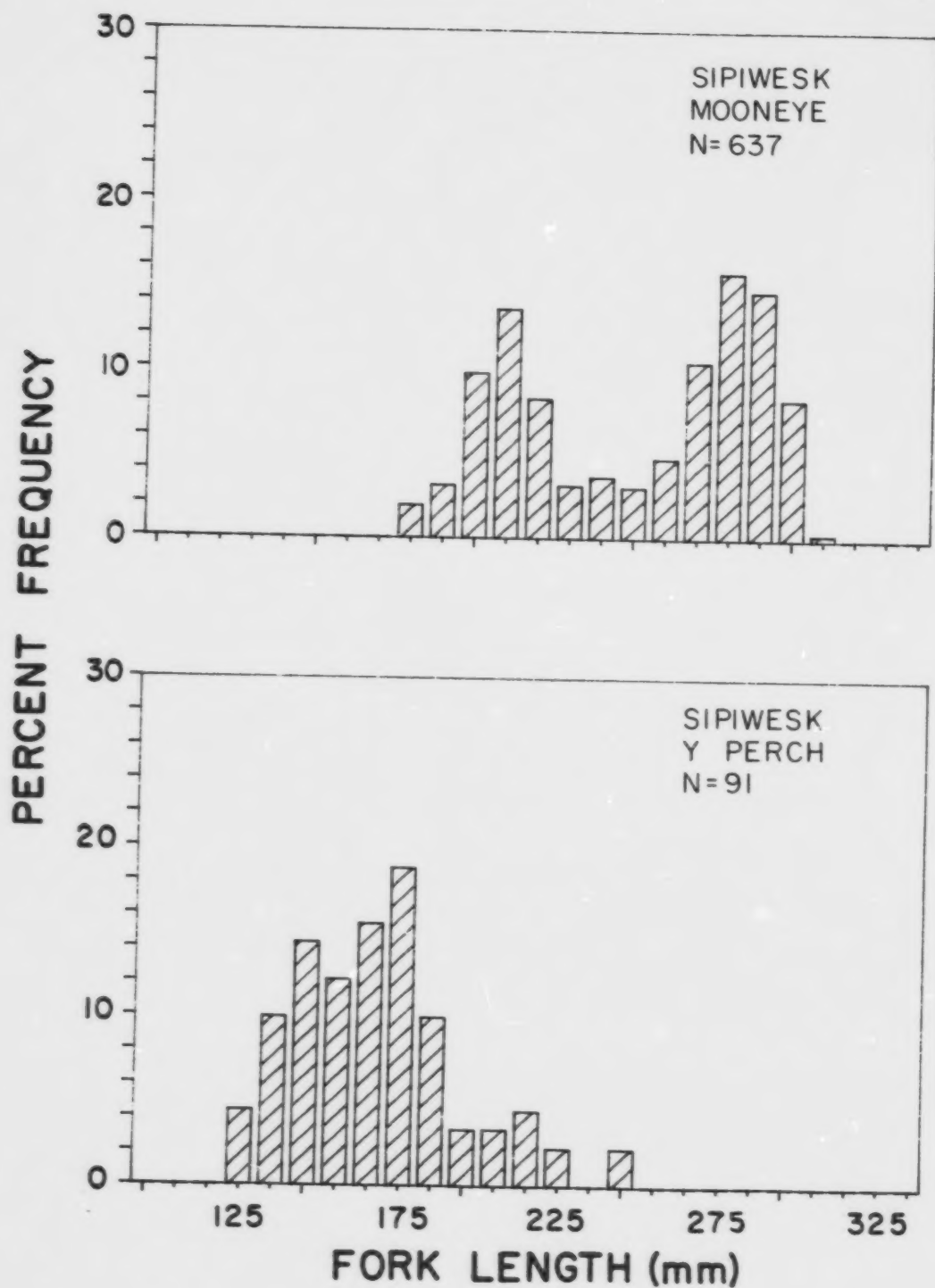


Fig. 26. Fork length frequencies for mooneye and yellow perch from Sipiwesk Lake, 1988.

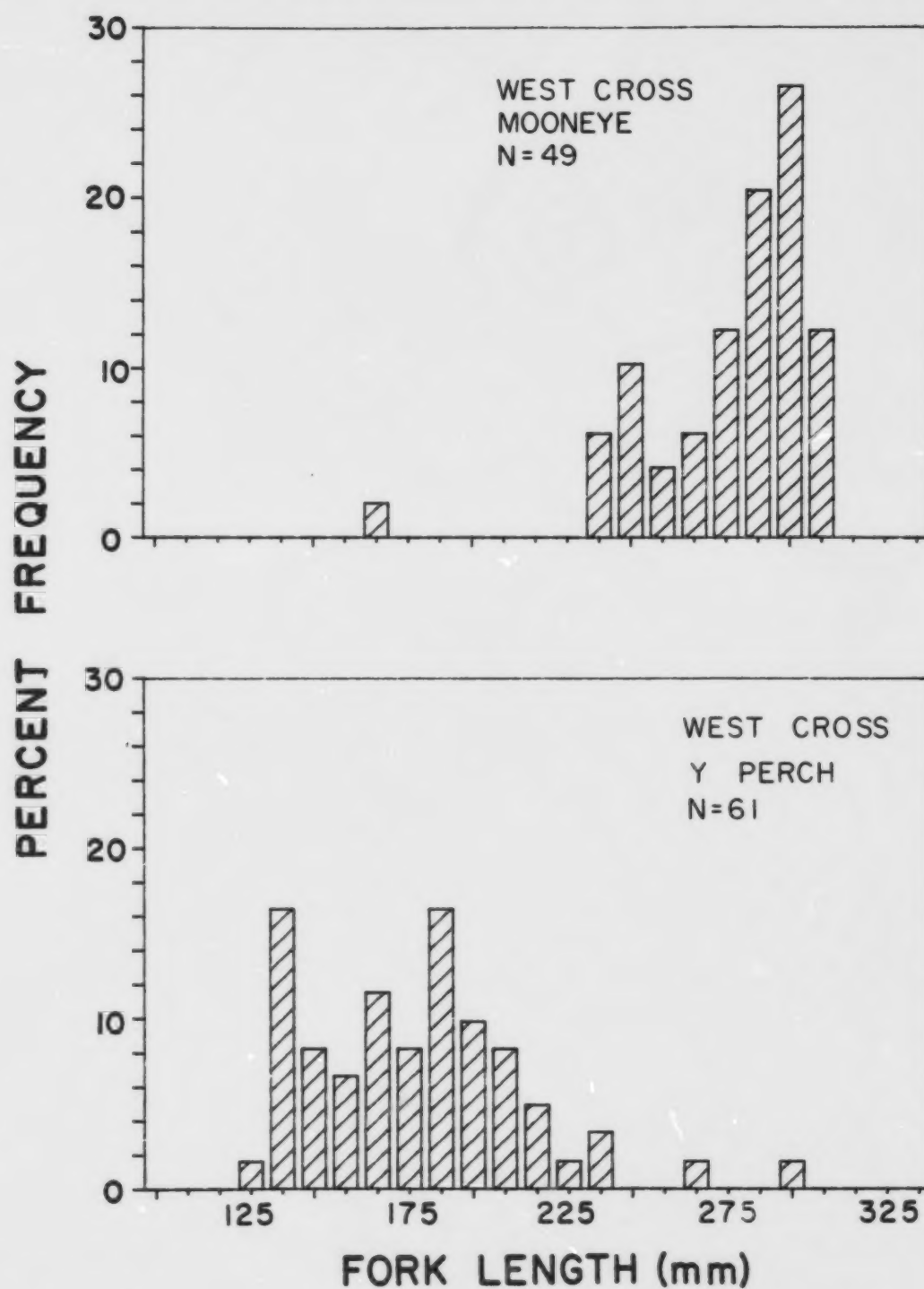


Fig. 27. Fork length frequencies for mooneye and yellow perch from West Cross Lake, 1988.

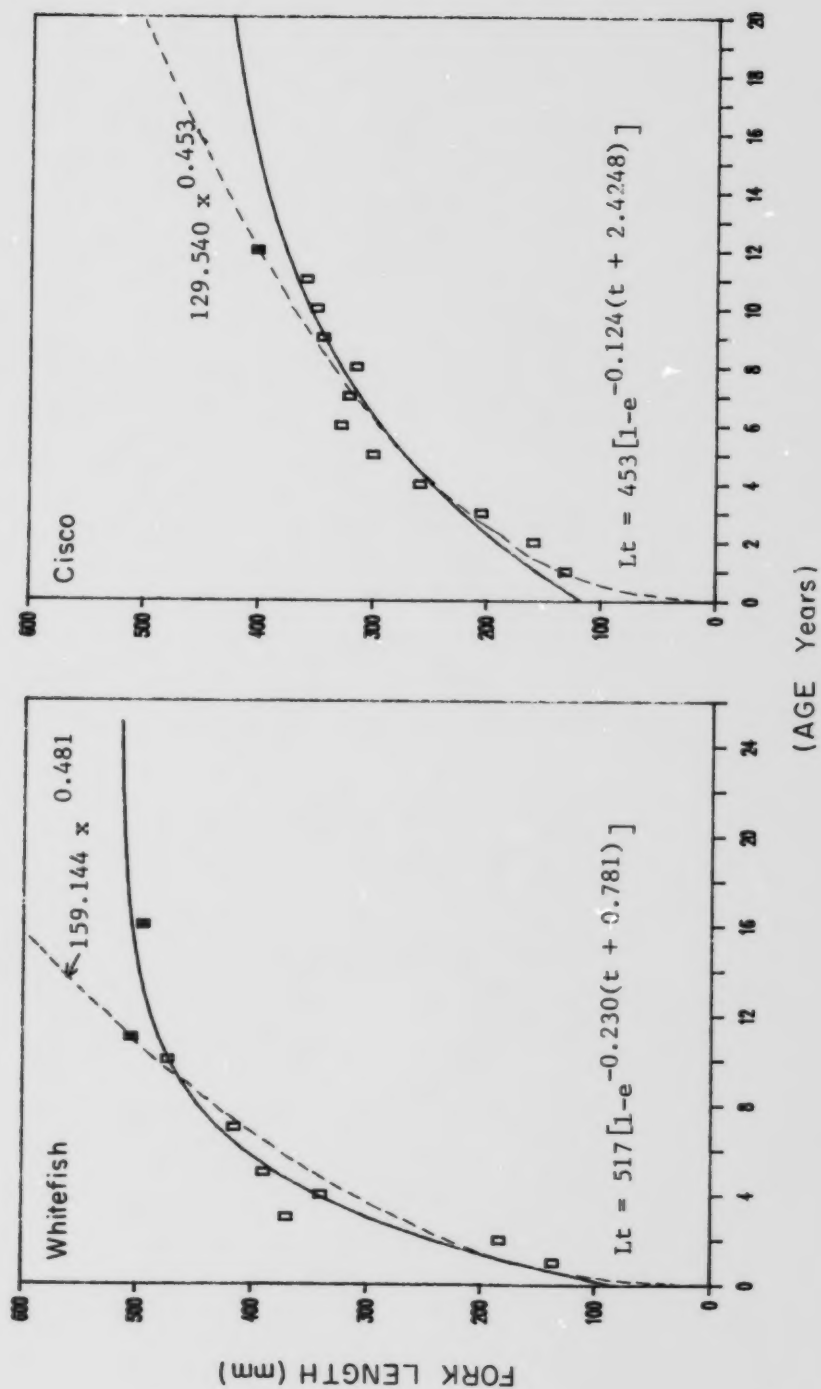


Fig. 28. Growth curves for whitefish and cisco from Sipiwesk Lake, 1988.
 ■ = excluded from Walford and Brody analysis.

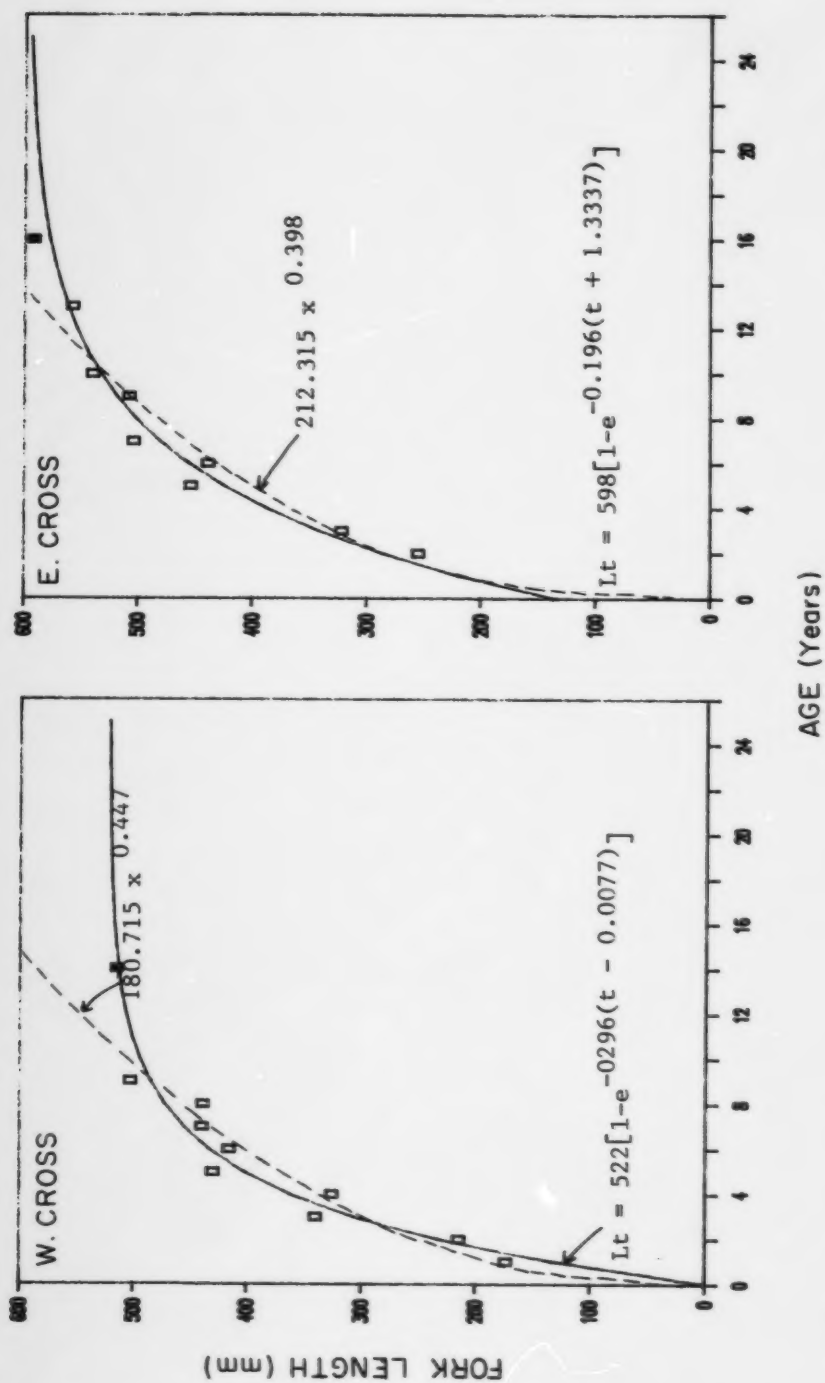


Fig. 29. Growth curves for whitefish from West and East Cross lakes, 1988.
 ■ = excluded from Walford and Brody analysis.

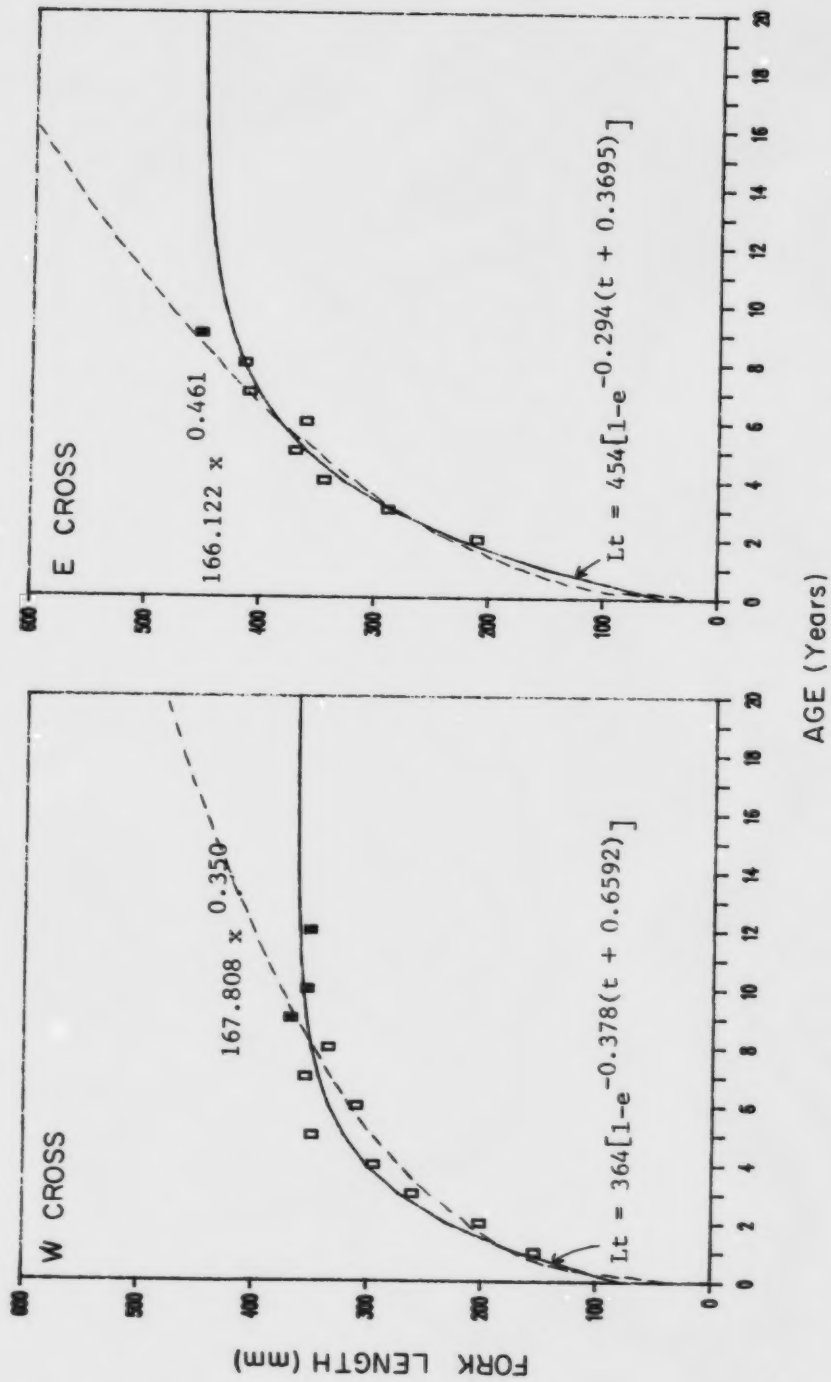


Fig. 30. Growth curves for cisco from West and East Cross lakes, 1988.
 ■ = excluded from Walford and Brody analysis.

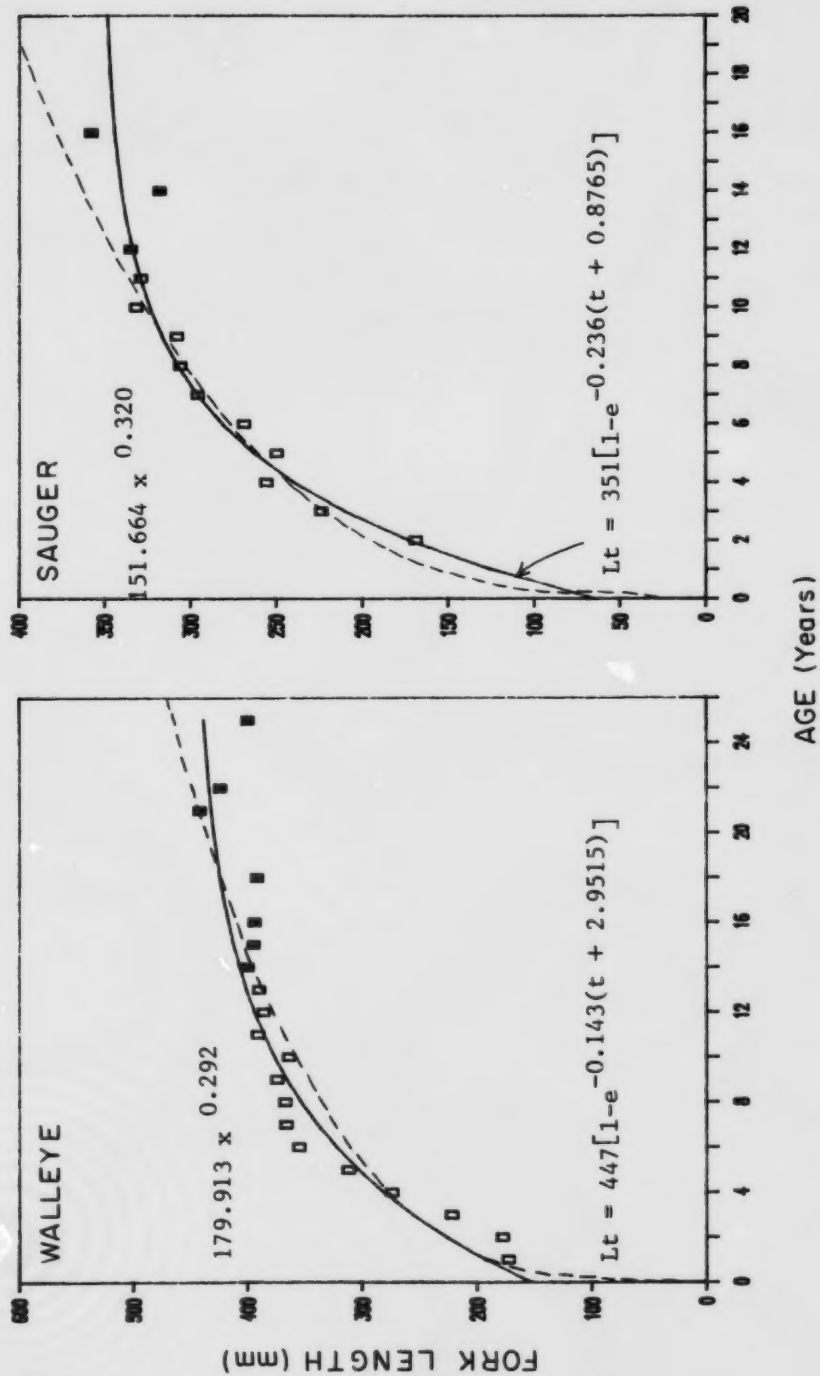


Fig. 31. Growth curves for walleye and sauger from Sipiwesk Lake, 1988.
 ■ = excluded from Walford and Brody analysis.

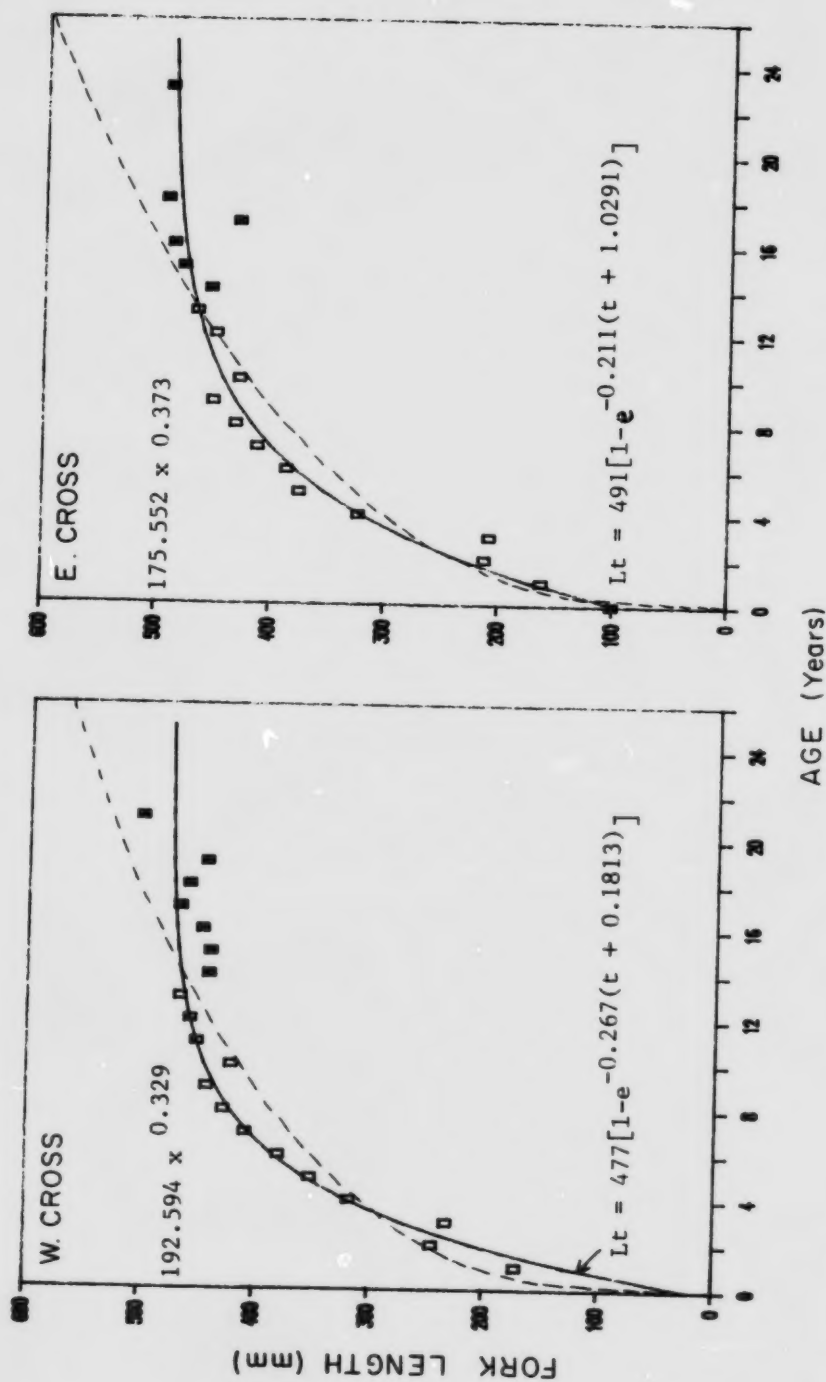


Fig. 32. Growth curves for walleye from West and East Cross lakes, 1988.
 ■ = excluded from Walford and Brody analysis.

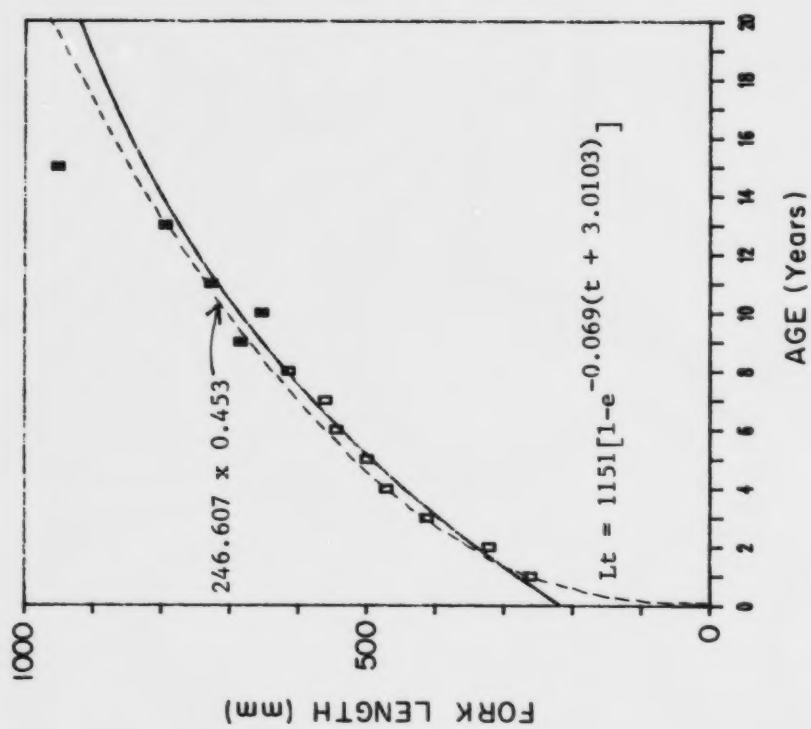


Fig. 33. Growth curves for northern pike from Sipiwek Lake, 1988.
 ■ = excluded from Walford and Brody analysis.

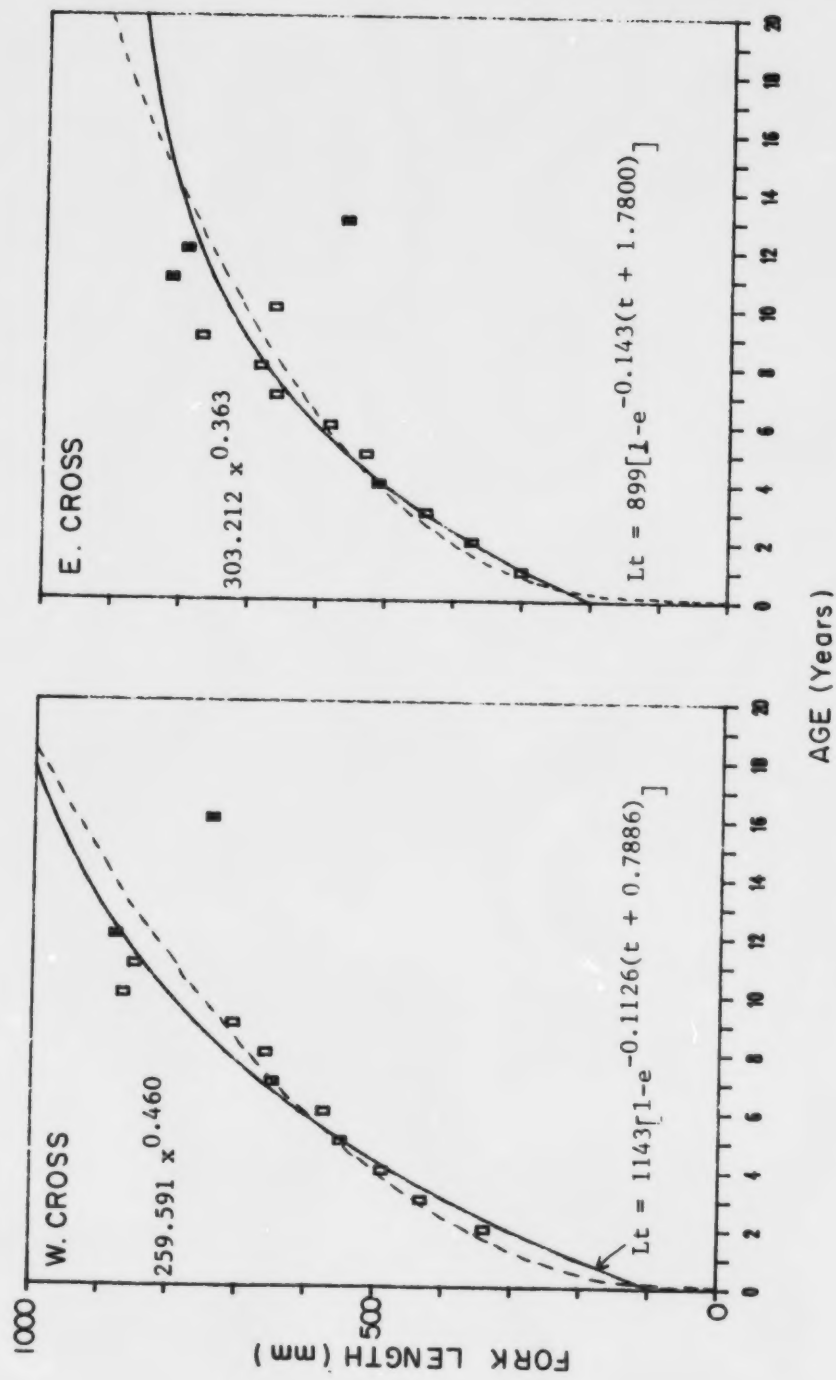


Fig. 34. Growth curves for northern pike from West and East Cross lakes, 1988.
 ■ = excluded from Brody analysis.

Table 1. Catch summary for experimental fishing sets from Siftweek Lake, 1988.

Set no.	Date of set	Whitefish	Cisco	Walleye	Sauger	Northern Pike	White sucker	Longnose sucker	Shorthead redhorse sucker	Silver redhorse sucker	Noonaye	Goldeye	Yellow perch	Barbot	Freshwater drum	Total
1	June 13		1	15		5	1				6	1				28
2	June 14	2	1	16	5	6	32		5		83		1	1		133
3	June 14		3	4	4	4	14				19					48
4	June 15		6	11	4	5	3	1	1		21	1				49
5	June 15			7	7	4	19				10	1	2			51
6	June 15		1	32	2	12	10	1	2		39		1			100
7	June 16			9	2	3	28		2		5		1	1		52
8	June 16	1	1	14	14	3	19	3	2		2	2	2			43
9	June 19		6	2	2	5	10		1		37	2				66
10	June 19		8	4	14	1	41				3		1			72
11	June 27	2	3	8	4	45	12		1							75
12	June 27		3	5	4	19	1					2				30
13	June 28		11	9		7	3				8					38
14	June 28		4	3	10	7	8					1	4			37
15	June 29			2	6	1	34		4		1		3		1	52
16	June 29		6	8	5	1	1		1		7	1				24
17	June 30	1		6	2	8	3				3	1				30
18	July 1	1	4		6	1	8		3				2			25
19	July 1		12		3	1	5									23
20	July 1	2	6		2	5	10					1	2			26
21	July 2		5	3	18	8	13									47
22	July 2		4	2	9	1	11		1			1	3			30
23	July 12	4	22	8	10	5	11		1				2			99
24	July 12	2	14	10	6	4	23				36		2			92
25	July 12	5	60	19		8	4				12		3			111
26	July 13		6	6	3	13	12		1	1	6		3			48
27	July 13	1	4	3	3	1	16				29				1	59
28	July 13		4	4	3	1	14				7				1	31
29	July 14		3	3	3	3	5		1		8		3			34
30	July 14	5	16	8	1	4	4				128	3	7			177
31	July 14	6	6	1	1	2			2		54					65
32	July 14	1	1	7	4	5	17		1		39		1			46
33	July 15		1	4	2	4					37					49
34	July 15		6	16		7	4				5	1				73
35	July 15	1	22	2	2	8	1									39
36	July 15		36	4		8	2									51
37	July 15		55	3		6	1									82
38	July 16		26	7	7	5	6						19			46
39	July 16	1	7	1		11	1						6			28
40	July 16		45	1		4	8						1			63
41	July 16		6	8		5	16						3	2		54
42	July 16		40	4		5							19			50
43	July 16	1	40			5										
Total		36	483	265	154	258	461	5	33	1	637	24	91	4	3	2435

Table 2. Catch summary for experimental fishing sets from West Cross Lake, 1988.

Set no.	Date of set	Whitefish	Clupeo	Walleye	Sauger	Northern Pike	White sucker	Storthead redbreast sucker	Mooneye	Goldeye	Yellow perch	Barbot	Freshwater drum	Total
1	Aug. 12	3	43	65		38	57	3			2			211
2	Aug. 13	9	42	52		41	39	1						183
3	Aug. 10	3	104	34	2	32	11	1		4	1			212
4	Aug. 11		83	12		14	5	1			3		1	165
5	Aug. 11		171	19		11	1				1			108
6	Aug. 12	8	40	24		16	3	2			12	1		221
7	Aug. 12	3	158	14		7	5	1			4			87
8	Aug. 13	3	72	49		20	5		1		2			199
9	Aug. 13	3	17	31		12	1	2			3			143
10	Aug. 22	1	73	29		9	4				5			65
11	Aug. 22	1		9		17	2	1			15			139
12	Aug. 23	3	2	22		4	15	12	1	1			1	20
13	Aug. 23	1	1	49		6	18	6	1	1				58
14	Aug. 24			46		14	20	1			4			114
15				7		12	9	2			4			101
16				36		3	15	6	4		2			27
17						7			7		3			74
Total		35	807	658	2	263	205	38	49	6	61	1	2	2127

Table 3. Catch summary for experimental fishing sets from East Cross Lake, 1988.

Set no.	Date of set	Whitefish	Cisco	Walleye	Northern Pike	White sucker	Shorthead redhorse sucker	Yellow perch	Total
1	Aug. 9	11	12	63	54	2	6	3	151
2	"	10	14	78	65	13	4	1	185
3	Aug. 10	2	4	21	20	4			51
4	"	3	17	52	49	2	4	4	131
									4
Total		26	47	214	188	21	14	8	518

Table 4. Catch per unit effort (CUE) & percent frequency of occurrence for fish from Sipiwek and Cross lakes, 1988. Number in parentheses are the number of standard gangs set in each lake.

Species	CUE (number/gang/day)			CUE (kg/gang/day)			Z frequency of occurrence		
	Sipiwek (43)	W. Cross (17)	E. Cross (4)	Sipiwek	W. Cross	E. Cross	Sipiwek	W. Cross	E. Cross
Whitefish	0.8	2.1	6.5	0.6	2.1	10.9	1.5	1.7	5.0
Cisco	10.8	47.5	11.8	1.7	11.8	8.4	19.0	37.9	9.1
Walleye	6.2	38.7	53.5	3.3	30.2	44.2	10.9	30.9	41.3
Sauger	3.6	0.1	—	0.8	0.1	—	6.3	0.1	—
Northern Pike	6.0	15.5	47.0	5.4	18.4	76.3	10.6	12.4	36.3
White sucker	10.7	12.1	5.3	10.6	14.9	6.5	18.9	9.6	4.1
Longnose sucker	0.1	—	—	0.1	—	—	0.2	—	—
Shorthead redhorse	0.8	2.2	3.5	0.5	1.9	3.3	1.4	1.8	2.7
Silver redhorse	0.02	—	—	0.1	—	—	<0.01	—	—
Mooneye	14.8	2.9	—	3.2	0.8	—	26.2	2.3	—
Goldeye	0.6	0.4	—	0.2	0.1	—	1.0	0.3	—
Yellow perch	2.1	3.6	2.0	0.2	0.3	0.4	3.7	2.9	1.5
Burbot	0.1	0.1	—	0.1	0.1	—	0.2	0.1	—
Freshwater drum	0.1	0.1	—	0.1	0.2	—	0.1	—	—
Total	56.6	125.1	129.5	26.8	80.9	150.1			

N.B. CUE for Sipiwek based on 150 yd gangs while Cross data based on 175 yd long gangs.

Table 5. Sum weights (kg) for fish caught in 43 experimental fishing sets in Sipiwesk Lake, 1988.

Species	Parameter	Mesh size (inches)						Total
		1.5	2.0	3.0	3.75	4.25	5.0	
Whitefish	N	10	7	3	3	7	6	36
	weights	0.55	0.66	0.25	2.56	12.01	9.64	25.67
Cisco	N	234	144	47	21	13	4	463
	weights	11.95	18.56	19.56	11.40	7.69	2.92	72.07
Walleye	N	29	45	99	75	17		265
	weights	7.50	17.80	50.74	49.77	14.08		139.88
Sauger	N	24	91	32	5	2		154
	weights	4.06	17.56	11.08	1.36	0.35		34.42
Northern pike	N	42	66	105	41	3	1	258
	weights	27.22	43.91	97.92	53.14	7.84	1.18	231.21
White sucker	N	8	14	103	142	136	58	461
	weights	1.22	4.49	80.65	133.32	154.62	83.63	457.92
Longnose sucker	N		2		1	2		5
	weights		1.40		0.65	1.55		3.60
Shorthead redhorse sucker	N	2	2	15	8	3	3	33
	weights	0.74	0.90	8.71	5.07	3.18	4.08	22.67
Silver redhorse sucker	N		1					1
	weights		2.61					2.61
Mooneye	N	13	294	213	99	12	6	637
	weights	2.14	41.16	57.44	33.23	3.63	1.52	139.10
Goldeye	N	1	8	11	3		1	24
	weights	0.29	2.35	4.43	1.38		0.69	9.14
Yellow perch	N	39	47	5				91
	weights	1.82	4.50	0.72				7.04
Burbot	N			1	1		2	4
	weights			0.50	0.98		3.79	5.27
Freshwater drum	N			1		2		3
	weights			1.27		2.38		3.65
Total	N	402	721	635	399	197	81	2435
	weights	57.479	155.894	333.265	292.851	207.327	107.447	1154.263

Table 6. Sum weights (kg) for fish caught in 17 experimental sets in West Cross Lake, 1988.

Species	Parameter	Mesh size (inches)							Total
		1.5	2.0	3.0	3.75	4.25	5.0	5.25	
Whitefish	N		7	3	8	3	7	7	35
	weights		0.99	2.10	11.10	2.95	9.59	9.10	35.83
Cisco	N	256	323	106	71	16	11	24	807
	weights	20.52	47.64	44.91	41.98	10.84	10.89	23.01	199.79
Walleye	N	56	96	170	187	112	27	10	658
	weights	23.98	59.26	118.35	151.19	116.85	34.04	8.99	512.67
Sauger	N			2					2
	weights			0.89					0.89
Northern pike	N	37	68	85	46	19	3	5	263
	weights	42.33	69.77	97.70	58.31	34.09	2.27	7.83	312.29
White sucker	N	2	9	27	43	71	38	15	205
	weights	0.11	6.11	30.24	44.23	85.87	59.81	26.60	252.97
Shorthead redhorse sucker	N		6	12	15	4	1		38
	weights		5.84	9.02	12.05	4.82	1.30		33.02
Mooneye	N	2	5	34	7		1		49
	weights	0.24	1.36	10.13	2.47		0.27		14.48
Goldeye	N	1	2	3					6
	weights	0.46	0.76	1.08					2.30
Yellow perch	N	28	31	1	1				61
	weights	1.39	3.37	0.26	0.40				5.41
Burbot	N							1	1
	weights							2.22	2.22
Freshwater drum	N					1		1	2
	weights					2.03		1.77	3.80
Total	N	382	547	443	378	226	88	63	2127
	weights	89.027	195.102	314.673	321.715	257.448	118.174	79.522	1375.661

Table 7. Sum weights (kg) for fish caught in 4 experimental sets in East Cross Lake, 1988.

Species	Parameter	Mesh size (inches)							Total
		1.5	2.0	3.0	3.75	4.25	5.0	5.25	
Whitefish	N		2	4	2	6	6	6	26
	weights		0.78	1.92	4.05	12.44	12.79	11.78	43.76
Cisco	N	3	9	11	8	6	7	3	47
	weights	0.27	1.73	5.87	7.89	6.85	7.17	3.96	33.72
Walleye	N	10	28	63	58	43	6	6	214
	weights	3.04	18.59	46.36	49.92	45.95	7.57	5.34	176.77
Northern pike	N	18	38	66	27	21	5	13	188
	weights	25.98	48.77	75.13	42.42	51.67	13.98	47.28	305.24
White sucker	N	1	3	1	4	5	7		21
	weights	0.04	0.99	0.89	4.64	6.91	12.56		26.03
Shorthead redhorse sucker	N		1	5	4	2		2	14
	weights		0.95	4.24	3.15	2.11		2.55	13.00
Yellow perch	N	3	1	4					8
	weights	0.23	0.27	1.25					1.75
Total	N	35	82	154	103	83	31	30	518
	weights	29.564	72.071	135.669	112.067	125.926	54.066	70.909	600.272

Table 8. Mesh size effects on whitefish catches from Sipiwesk Lake, 1988.

		Mesh size (inches)					
		1.50	2.00	3.00	3.75	4.25	5.00
		Total					
Number caught	10						
CUE (No/100 yds/day)	0.93		7	3	3	7	6
CUE (Kg/100 yds/day)	0.05		0.65	0.28	0.28	0.65	0.56
			0.06	0.02	0.24	1.12	0.90
Mean Length(mm)	159 ± 23.43	189 ± 7.70	182 ± 7.51	347 ± 114.79	452 ± 78.54	462 ± 49.56	290 ± 144.50
Mean Weight(g)	55 ± 25.09	95 ± 21.62	82 ± 15.52	853 ± 695.50	1716 ± 817.64	1607 ± 659.05	713 ± 882.55
Number Mature	10	7	3	2	6	4	12
Number Immature				1	1	1	23
% Mature				66.7	85.7	80.0	34.3
Mean age (Years)	1.6	2.0	2.0	4.0	9.2	8.8	4.2
Age(years)							
1	40.0						12.1
2	60.0						51.5
3		100.0	100.0	33.3			3.0
4				33.3			3.0
5					16.7		3.0
7						25.0	3.0
10				33.3			9.1
11					33.3		12.1
16					16.7	75.0	3.0
					16.7		3.0
Number of unknown ages					1	2	3
Total effort for each mesh size was 1075 yards of net.							
± = standard deviation							
Number with unknown sex =							1
Number with unknown maturity =							1

Table 9. Mesh size effects on whitefish catches from West Cross Lake, 1988.

Mesh size (inches)									
	1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total	
Number caught		7	3	8	3	7	7	35	
CUE (No/100 yds/day)		1.65	0.71	1.88	0.71	1.65	1.65	1.18	
CUE (Kg/100 yds/day)		0.23	0.49	2.61	0.69	2.26	2.14	1.20	
Mean Length(mm)		215 ± 29.85	357 ± 31.77	430 ± 53.01	395 ± 68.48	434 ± 34.57	428 ± 11.52	378 ± 93.13	
Mean Weight(g)		141 ± 72.87	700 ± 239.57	1388 ± 614.04	984 ± 594.16	1370 ± 515.56	1300 ± 176.73	1024 ± 629.61	
Number Mature			1	7		7	7	22	
Number Immature		7	2	1	3	100.0	100.0	13	
% Mature			33.33	87.5				62.9	
Mean age (Years)		2.0	4.3	7.0	5.7	5.7	5.7	5.1	
Age(years)				Frequency (%)					
1		14.3						2.9	
2		71.4						14.3	
3		14.3						11.4	
4			33.3	12.5		14.3		5.7	
5			33.3		33.3		42.9	22.9	
6				25.0	33.3	28.6	42.9	22.9	
7			33.3	12.5		42.9	14.3	5.7	
8				25.0	33.3			8.6	
9						14.3		2.9	
14				12.5				2.9	

Total effort for each mesh size was 425 yards of net.

± = standard deviation

Table 10. Mesh size effects on whitefish catches from East Cross Lake, 1988.

	Mesh size (inches)								Total
	1.50	2.00	3.00	3.75	4.25	5.00	5.25		
Number caught		2	4	2	6	6	6	26	
CUE (No/100 yds/day)		2.00	4.00	2.00	6.00	6.00	6.00	3.71	
CUE (Kg/100 yds/day)		0.78	1.92	4.05	12.44	12.79	11.78	6.25	
Mean Length(mm)		299 ± 32.53	294 ± 92.77	489 ± 12.73	480 ± 56.31	483 ± 38.55	486 ± 48.49	440 ± 94.78	
Mean Weight(g)		389 ± 162.63	481 ± 520.17	2025 ± 35.36	2073 ± 896.61	2132 ± 493.62	1963 ± 724.73	1683 ± 909.04	
Number Mature	1	1	1	2	6	6	6	22	
Number Immature	1	3	3					4	
% Mature	50.0	50.0	25	100.0	100.0	100.0	100.0	84.6	
Mean age (Years)	2.5		2.8	6.0	6.8	6.7	7.3	5.9	
Age(years)	Frequency (%)								
2	50.0		75.0					15.4	
3	50.0							3.8	
5			25.0	50.0	83.3	33.3	50.0	46.2	
6						16.7		3.8	
7				50.0		33.3	16.7	15.4	
9							16.7	3.8	
10						16.7		3.8	
13								3.8	
16					16.7		16.7	3.8	

Total effort for each mesh size was 100 yards of net.
 ± = standard deviation

Table 11. Mesh size effects on cisco catches from Sipiyesk Lake, 1988.

Mesh size (inches)							
	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	234	144	47	21	13	4	463
CUE (No/100 yds/day)	21.77	13.40	4.37	1.95	1.21	0.37	7.18
CUE (kg/100 yds/day)	1.11	1.73	1.82	1.06	0.72	0.27	1.12
Mean Length(mm)	149 ± 23.09	197 ± 35.72	284 ± 46.12	306 ± 51.01	323 ± 28.68	333 ± 83.39	191 ± 63.99
Mean Weight(g)	51 ± 45.00	129 ± 98.43	416 ± 228.36	543 ± 260.65	591 ± 139.28	729 ± 410.23	156 ± 203.51
Number Mature	4	20	38	17	12	3	94
Number Immature	128	40	2	1		1	172
% Mature	3.0	33.3	95	94.4	100.0	75.0	35.3
Mean age (Years) *	1.8 (126)	3.1 (57)	5.6 (40)	6.0 (17)	7.1 (11)	8.3 (4)	3.3 (255)
Age(years)	Frequency (%)						
1	33.3	1.8					16.9
2	57.1	38.6	2.5	5.9			37.6
3	8.7	22.8	5.0	5.9		25.0	11.0
4		28.1	47.5	11.8	18.2		15.3
5		5.3	7.5	29.4	9.1		4.7
6			2.5	11.8	18.2		2.0
7		1.8	15.0	17.6	18.2		4.7
8		1.8	5.0		9.1		1.6
9	0.8		2.5	5.9		25.0	0.9
10			7.5		18.2	25.0	2.4
11			2.5	11.8	9.1	25.0	2.0
12			2.5				0.4
Number of unknown ages	108	87	7	4	2		208

Total effort for each mesh size was 1075 yards of net.

 $\pm$ = standard deviation

Number with unknown sex = 197

Number with unknown maturity= 197

* = Age data based on number in parenthesis.

Table 12. Mesh size effects on cisco catches from West Cross Lake, 1988.

Mesh size (inches)									
	1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total	
Number caught (1.)	256	323	106	71	16	11	24	807	
CUE (No/100 yds/day)	60.23	76.00	24.94	16.71	3.76	2.59	5.65	27.13	
CUE (Kg/100 yds/day)	4.83	11.21	10.57	9.88	2.55	2.56	5.41	6.72	
Number sampled 2.	198	217	106	71	16	11	24	643	
Mean Length(mm)	168 ± 36.23	208 ± 38.02	290 ± 39.60	315 ± 45.66	340 ± 33.30	372 ± 22.57	366 ± 28.13	233 ± 74.37	
Mean Weight(g)	85 ± 111.29	161 ± 143.02	424 ± 253.17	591 ± 315.12	678 ± 199.78	990 ± 212.21	959 ± 233.35	285 ± 309.82	
Number Mature	5	10	46	47	8	10	20	146	
Number Immature	98	121	14	3				236	
% Mature	4.9	7.6	76.66	94.0	100.0	100.0	100.0	38.2	
Mean age (Years) 3.	1.6 (104)	2.3 (131)	5.0 (60)	5.5 (50)	6.3 (8)	5.8 (10)	5.4 (20)	3.3 (383)	

Age(years)	Frequency (%)											
1	55.8	6.9										17.5
2	39.4	75.6	5.0	4.0								37.9
3	1.0	6.1	8.3	6.0								4.4
4	1.9	4.6	31.7	20.0								10.7
5	1.0	3.8	15.0	22.0	12.5	10.0						10.7
6		2.3	30.0	32.0	25.0	40.0	10.0					12.0
7			1.7	2.0	25.0	30.0	5.0					11.2
8			3.3	2.0	12.5	10.0	5.0					1.3
9		0.8	5.0	2.0	12.5	12.5	5.0					1.3
10	1.0			10.0	12.5	10.0	5.0					1.9
12				2.0								0.3
Number of unknown ages	94	86	46	21	8	1	24	260				

total effort for each mesh size was 1200 yards of net

Total effort for each mesh size was 425 yards of net.

+ = standard deviation

Number with unknown sex = 288

Number with unknown maturity = 261

1. 58 and 106 cisco from the 1.5" and 2.0" mesh, respectively were counted and bulk weighed only.

2. Rest of table calculations based on number sampled except where indicated.

3. Age data based on number in parenthesis.

Table 13. Mesh size effects on cisco catches from East Cross Lake, 1988.

Mesh size (inches)										
	1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total		
Number caught	3	9	11	8	6	7	3	47		
CUE (No/100 yds/day)	3.00	9.00	11.00	8.00	6.00	7.00	3.00	6.71		
CUE (Kg/100 yds/day)	0.27	1.73	5.87	7.89	6.85	7.17	3.96	4.82		
Mean Length(mm)	190 ± 29.51	222 ± 48.96	307 ± 49.95	354 ± 63.75	385 ± 61.35	365 ± 75.58	407 ± 21.57	316 ± 85.75		
Mean Weight(g)	91 ± 42.44	192 ± 183.92	533 ± 255.72	986 ± 540.90	1141 ± 652.40	1024 ± 534.17	1320 ± 301.99	718 ± 560.10		
Number Mature	3	3	10	7	6	6	2	34		
Number Immature	3	6	1	1		1		12		
% Mature		33.3	90.90	87.5	100.0	85.7	100.0	73.9		
Mean age (Years)	2.0	2.4	3.6	5.1	6.0	5.3	7.0	4.3		
Age(years)	Frequency (%)									
2	100.0	88.9	18.2	12.5		14.3		31.9		
3			27.3	12.5				8.5		
4			36.4	12.5	33.3	14.3		17.0		
5			9.1	25.0	16.7	28.6	33.3	14.9		
6		11.1	9.1	12.5		28.6		10.6		
7					33.3		33.3	6.4		
8				25.0				4.3		
9					16.7	14.3	33.3	6.4		

Total effort for each mesh size was 100 yards of net.

± = standard deviation

Number with unknown sex = 1

Number with unknown maturity = 1

Table 14. Mesh size effects on walleye catches from Sipiwesk Lake, 1988.

		Mesh size (inches)					
		1.50	2.00	3.00	3.75	4.25	5.00
		Total					
Number caught	29	45	99	75	17		265
CUE (No/100 yds/day)	2.70	4.19	9.21	6.98	1.58		4.11
CUE (kg/100 yds/day)	0.70	1.66	4.72	4.63	1.31		2.17
Mean Length(mm)	258 ± 94.10	316 ± 65.28	355 ± 29.74	383 ± 38.42	408 ± 29.50		349 ± 64.08
Mean Weight(g)	259 ± 234.00	395 ± 243.84	513 ± 141.31	664 ± 184.16	828 ± 169.30		528 ± 237.57
Number Mature	8	15	57	65	14		159
Number Immature	21	30	42	10	3		106
% Mature	27.6	33.3	57.57	86.7	82.4		60.0
Mean age (Years)	5.0	6.2	8.2	10.2	13.2		8.4
Age(years)				Frequency (%)			
1	10.3						1.1
2	41.4	6.7		1.3			6.0
3		2.2					0.4
4		13.3					2.3
5	3.4	28.9	19.2	8.0	5.9		15.1
6	6.9	6.7	3.0	4.0	5.9		4.5
7	6.9	26.7	30.3	20.0	17.6		23.4
8	6.9		9.1	8.0			6.4
9	10.3	4.4	17.2	17.3	11.8		14.0
10	6.9		5.1				2.6
11		4.4	2.0	2.7			2.3
12	6.9	2.2	3.0	9.3			4.9

Total effort for each mesh size was 1075 yards of net.

± = standard deviation

Table 15. Mesh size effects on walleye catches from West Cross Lake, 1988.

		1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total
Number caught	56		96	170	187	112	27	10	658
CUE (No/100 yds/day)	13.18		22.59	40.00	44.00	26.35	6.35	2.35	22.12
CUE (Kg/100 yds/day)	5.64		13.94	27.85	35.57	27.49	8.01	2.12	17.23
Mean Length(mm)	305 ± 100.84	364 ± 67.44	387 ± 46.81	406 ± 39.07	440 ± 26.35	464 ± 24.82	412 ± 72.61	395 ± 64.39	
Mean Weight(g)	428 ± 342.36	617 ± 304.25	696 ± 271.78	809 ± 236.63	1043 ± 192.77	1261 ± 233.47	899 ± 422.49	779 ± 326.99	
Number Mature	28	71	135	162	107	25	9	537	
Number Immature	28	25	35	25	5	2	1	121	
% Mature	50.0	74.0	79.41	86.6	95.5	92.6	90.0	81.6	
Mean age (Years)	4.5	6.5	6.8	7.6	9.1	10.3	6.9	7.3	
Age(years)	Frequency (%)								
1	28.6	1.0							2.6
2	7.1	7.3					3.7	10.0	2.0
3		2.1							0.3
4	10.7	7.3							4.3
5	17.9	27.1	6.5	2.1					20.5
6	3.6	8.3	34.1	20.3					3.8
7	19.6	24.0	4.1	2.7	2.7				31.8
8	1.8	2.1	32.4	41.7	32.1				2.4
9	8.9	11.5	2.9	2.1	2.7				20.7
10		1.0	14.1	17.6	43.8				0.9
11				1.6	1.8				0.6
12		4.2	2.4	0.5	1.8				4.4
13			0.6	5.9	4.5				1.2
14		1.0	1.2	2.1	1.8				1.5
15	1.8		0.6	0.5	4.5				1.2
16		2.1		2.7	0.9				0.5
17		1.0							0.3
18			0.6		0.9				0.8
19					0.9				0.2
21			0.6						0.2

Total effort for each mesh size was 425 yards of net.

± = standard deviation

Number with unknown sex = 1

Table 16. Mesh size effects on walleye catches from East Cross Lake, 1988.

		Mesh size (inches)							
		1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total
Number caught	10		28	63	58	43	6	6	214
CUE (No/100 yds/day)	10.00		28.00	63.00	58.00	43.00	6.00	6.00	30.57
CUE (Kg/100 yds/day)	3.04		18.59	46.36	49.92	45.95	7.57	5.34	25.25
Mean Length(mm)	244 ± 132.78	373 ± 75.53	393 ± 48.86	420 ± 31.06	450 ± 37.41	473 ± 39.66	414 ± 40.16	405 ± 69.05	
Mean Weight(g)	304 ± 417.70	664 ± 304.91	736 ± 205.49	861 ± 177.26	1069 ± 214.11	1262 ± 311.73	890 ± 279.54	826 ± 298.92	
Number Mature	3	22	61	58	43	6	6	6	199
Number Immature	7	6	2						15
% Mature	30.0	78.6	96.82	100.0	100.0	100.0	100.0	100.0	93.0
Mean age (Years)	2.7	6.6	7.1	7.8	10.0	13.0	7.3	7.8	
Age(years)									
	0			1.6					0.5
	1	60.0							2.8
	2	10.0	7.1						1.4
	3		7.1						0.9
	4		3.6						0.9
	5	10.0	21.4	31.7	6.9	2.3			15.0
	6		14.3	11.1	8.6	2.3			8.4
	7	20.0	25.0	34.9	55.2	27.9	16.7	33.3	36.4
	8		3.6	4.8	1.7	4.7	16.7	33.3	3.7
	9		7.1	6.3	15.5	30.2		33.3	14.0
	10				1.7				0.5
	12		3.6	1.6	1.7	9.3			3.3
	13		3.6	1.6	5.2	4.7			3.3
	14			1.6	3.4	9.3			3.3
	15						50.0		1.4
	16		3.6	1.6		4.7			1.9
	17			1.6			16.7		0.5
	18			1.6		2.3			1.4
	23					2.3			0.5

Total effort for each mesh size was 100 yards of net.
 ± = standard deviation

Table 17. Mesh size effects on sauger catches from Sipiwesk Lake, 1988.

	1.50	2.00	3.00	3.75	4.25	5.00	Total
Number caught	24	91	32	5	2		154
CUE (No/100 yds/day)	2.23	8.47	2.98	0.47	0.19		2.39
CUE (Kg/100 yds/day)	0.38	1.63	1.03	0.13	0.03		0.53
Mean Length(mm)	254 ± 37.42	271 ± 30.17	326 ± 37.89	291 ± 75.98	261 ± 15.56		280 ± 42.34
Mean Weight(g)	169 ± 76.26	193 ± 63.34	346 ± 103.86	272 ± 195.07	176 ± 33.94		223 ± 103.43
Number Mature	8	55	26	2			91
Number Immature	16	36	5	3	2		62
% Mature	33.3	60.4	83.87	40.0			59.5
Mean age (Years) *	5.3 (24)	6.3 (88)	8.4 (28)	7.4 (5)	7.0 (2)		6.6 (147)
Age(years)	Frequency (%)						
2	4.2						0.7
3		1.1					1.4
4	4.2	12.5	7.1	40.0			12.9
5	16.7	30.7	10.7				25.2
6	29.2	21.6	14.3	20.0			21.1
7	29.2	17.0	14.3		100.0		16.3
8	12.5	4.5	14.3				6.1
9	4.2	1.1	3.6				1.3
10		2.3	10.7				3.4
11		5.7	7.1	20.0			5.4
12		3.4	10.7	20.0			4.8
14			3.6				0.7
16			3.1				0.7
Number of unknown ages		3	4				7

Total effort for each mesh size was 1075 yards of net.

$\pm$ = standard deviation

Number with unknown sex =

Number with unknown maturity= 1

* = Age data based on number in parenthesis.

Mesh size (inches)

Total effort for each mesh size was 425 yards of net.
+ = standard deviation

Table 19. Mesh size effects on northern pike catches from Sipiwesk Lake, 1988.

		Mesh size (inches)							
		1.50	2.00	3.00	3.75	4.25	5.00	Total	
Number caught	42	66	105	41	3	1	258		
CUE (No/100 yds/day)	3.91	6.14	9.77	3.81	0.28	0.09	4.00		
CUE (Kg/100 yds/day)	2.53	4.08	9.11	4.94	0.73	0.11	3.58		
Mean Length(mm)	423 ± 116.00	436 ± 85.28	506 ± 63.56	568 ± 76.23	702 ± 86.81	550 ± -	487 ± 98.24		
Mean Weight(g)	648 ± 457.38	665 ± 375.13	933 ± 608.47	1296 ± 632.01	2613 ± 1017.91	1180 ± -	896 ± 611.20		
Number Mature	26	51	96	39	3	1	216		
Number Immature	16	15	9	2			42		
% Mature	61.9	77.3	91.42	95.1	100.0	100.0	83.7		
Mean age (Years)	3.7	4.0	5.0	6.3	8.0	6.0	4.8		
Age(years)				Frequency (%)					
1	14.3	3.0					3.1		
2	21.4	13.6					7.0		
3	9.5	24.2	10.5	2.4			12.4		
4	21.4	25.8	29.5	4.9			22.9		
5	16.7	16.7	25.7	24.4			21.3		
6	9.5	9.1	23.8	43.9	33.3	100.0	21.3		
7	4.8	4.5	8.6	4.9			6.2		
8			1.0	9.8	33.3		2.3		
9		3.0		4.9	33.3		1.6		
10	2.4						0.8		
11				2.4			0.4		
13				2.4			0.4		
15			1.0				0.4		

Number of unknown ages

Total effort for each mesh size was 1075 yards of net.
+ = standard deviation

Table 20. Mesh size effects on northern pike catches from West Cross Lake, 1988.

		Mesh size (inches)							Total
		1.50	2.00	3.00	3.75	4.25	5.00	5.25	
Number caught	37	68	85	46	19	3	5	5	263
CUE (No/100 yds/day)	8.71	16.00	20.00	10.82	4.47	0.71	1.18	1.84	8.84
CUE (kg/100 yds/day)	9.96	16.42	22.99	13.72	8.02	0.54	1.84	1.84	10.50
Mean Length(mm)	527 ± 113.26	501 ± 121.06	542 ± 70.89	555 ± 81.15	616 ± 102.36	466 ± 121.80	597 ± 98.79	537 ± 101.12	
Mean Weight(g)	1144 ± 834.09	1026 ± 936.22	1149 ± 508.52	1268 ± 551.46	1794 ± 954.99	758 ± 502.30	1566 ± 718.91	1187 ± 753.97	
Number Mature	35	63	75	42	19	3	5	5	242
Number Immature	2	5	10	4					21
% Mature	94.6	92.6	88.23	91.3	100.0	100.0	100.0	100.0	92.0
Mean age (Years)	4.8	4.8	5.1	5.2	6.1	3.3	6.4	5.1	
Age(years)									
									Frequency (%)
2	5.4	5.9							2.7
3	21.6	25.0				33.3			15.2
4	24.3	30.9	9.4	13.0	5.3				26.6
5	13.5	10.3	32.9	10.9	26.3	66.7			17.9
6	16.2	13.2	18.8	32.6	10.5		40.0		20.5
7	10.8	4.4	25.9	30.4	15.8				9.1
8	2.7	4.4	5.9	10.9	26.3		40.0		4.6
9	5.4	1.5	1.2	2.2	5.3		20.0		1.9
10		1.5			5.3				0.4
11		1.5							0.4
12									0.4
16		1.5			5.3				0.4

Total effort for each mesh size was 425 yards of net.
± = standard deviation

Table 21. Mesh size effects on northern pike catches from East Cross Lake, 1988.

		Mesh size (inches)								Total
		1.50	2.00	3.00	3.75	4.25	5.00	5.25		
Number caught	18	38	66	27	21	5	13	188		
CUE (No/100 yds/day)	18.00	38.00	66.00	27.00	21.00	5.00	13.00	26.86		
CUE (Kg/100 yds/day)	25.98	48.77	75.13	42.42	51.67	13.98	47.28	43.61		
Mean Length(mm)	537 ± 161.60	533 ± 125.33	534 ± 87.84	594 ± 79.95	666 ± 102.65	696 ± 102.72	759 ± 128.28	577 ± 127.56		
Mean Weight(g)	1444 ±1262.47	1283 ±1093.97	1138 ± 818.68	1571 ± 746.75	2460 ±1242.39	2796 ±1286.17	3637 ±1352.24	1624 ±1231.80		
Number Mature	16	37	65	27	21	5	13	184		
Number Immature	2	1	1					4		
% Mature	88.9	97.4	98.48	100.0	100.0	100.0	100.0	97.9		
Mean age (Years)	5.4	5.4	4.9	6.0	7.1	8.6	8.8	5.8		
Age(years)	Frequency (%)									
1	16.7							1.6		
2		10.5	3.0	7.4				3.2		
3	11.1	10.5	12.1	22.2	4.8		7.7	9.6		
4	16.7	18.4	28.8	7.4				19.1		
5	16.7	21.1	30.3	25.9	14.3	20.0		19.7		
6	11.1	10.5	15.2	11.1	4.8		7.7	13.3		
7		10.5	1.5	18.5	28.6		7.7	8.0		
8	11.1	2.6	4.5	3.7	19.0	20.0	7.7	9.0		
9	5.6	13.2	1.5	3.7	19.0	20.0	30.8	9.0		
10			1.5			20.0	15.4	2.7		
11			1.5	3.7	4.8	20.0	7.7	2.7		
12	11.1	2.6						1.6		
13								0.5		

Total effort for each mesh size was 100 yards of net.
 ± = standard deviation

Table 22. Mesh size effects on white, longnose, shorthead redhorse and silver redhorse sucker catches from Sipiwek Lake, 1988.

Species	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	Total
White sucker	Number caught	8	14	142	136	58	461
	CUE (No/100 yds/day)	0.74	1.30	13.21	12.65	5.40	7.15
	CUE (Kg/100 yds/day)	0.11	0.42	12.40	14.38	7.78	7.10
	Mean Length(mm)	201 ± 62.44	263 ± 69.10	386 ± 33.68	412 ± 25.82	443 ± 24.64	388 ± 55.79
Longnose sucker	Mean Weight(g)	152 ± 159.94	321 ± 319.90	939 ± 261.21	1137 ± 216.24	1442 ± 221.77	993 ± 370.04
	Number caught	2	2	1	2		5
	CUE (No/100 yds/day)	0.19	0.19	0.09	0.19		0.08
	CUE (Kg/100 yds/day)	0.13	0.13	0.06	0.14		0.06
Shorthead redhorse sucker	Mean Length(mm)		369 ± 18.38				
	Mean Weight(g)		700 ± 141.42				
	Number caught	2	2				
	CUE (No/100 yds/day)	0.19	0.19				
Silver redhorse sucker	CUE (Kg/100 yds/day)	0.07	0.08				
	Mean Length(mm)	252 ± 113.14	309 ± 30.41	330 ± 25.55	334 ± 11.15	432 ± 22.59	340 ± 50.47
	Mean Weight(g)	369 ± 417.19	448 ± 107.48	581 ± 143.90	634 ± 78.99	1060 ± 249.80	687 ± 314.31
	Number caught	1	1				1
	CUE (No/100 yds/day)	0.09	0.09				0.01
	CUE (Kg/100 yds/day)	0.06	0.06				0.04
	Mean Length(mm)		521 ±				521 ±
	Mean Weight(g)		2610 ±				2610 ±

Total effort for each mesh size was 1075 yards of net.

± = standard deviation

Table 23. Mesh size effects on mooneye, goldeye, yellow perch, burbot and freshwater drum catches from Sipiwek Lake, 1988.

Species	Mesh size (inches)									
	1.50	2.00	3.00	3.75	4.25	5.00	Total			
Mooneye	Number caught	294	213	99	12	6	637			
	CUE (No/100 yds/day)	1.21	27.35	19.81	9.21	0.56	9.88			
	CUE (Kg/100 yds/day)	0.20	3.83	5.34	3.09	0.14	2.16			
	Mean Length(mm)	229 ± 36.03	214 ± 27.61	268 ± 18.55	280 ± 14.26	263 ± 33.88	244 ± 37.15			
Goldeye	Mean Weight(g)	165 ± 75.47	140 ± 65.14	270 ± 56.31	336 ± 48.69	253 ± 84.23	218 ± 98.56			
	Number caught	1	8	11	3	1	24			
	CUE (No/100 yds/day)	0.09	0.74	1.02	0.28	0.09	0.37			
	CUE (Kg/100 yds/day)	0.03	0.22	0.41	0.13	0.06	0.14			
Yellow perch	Mean Length(mm)	292 ± -	292 ± 28.84	319 ± 31.16	334 ± 13.65	388 ± -	313 ± 34.50			
	Mean Weight(g)	289 ± -	294 ± 101.19	403 ± 114.92	459 ± 38.02	694 ± -	381 ± 131.32			
	Number caught	39	47	5			91			
	CUE (No/100 yds/day)	3.63	4.37	0.47			1.41			
Burbot	CUE (Kg/100 yds/day)	0.17	0.42	0.07			0.11			
	Mean Length(mm)	145 ± 11.25	181 ± 17.05	200 ± 46.59			167 ± 25.86			
	Mean Weight(g)	47 ± 10.73	96 ± 28.03	144 ± 90.34			77 ± 40.58			
	Number caught			1	1	2	4			
Freshwater drum	CUE (No/100 yds/day)			0.09	0.09	0.19	0.06			
	CUE (Kg/100 yds/day)			0.05	0.09	0.35	0.08			
	Mean Length(mm)			422 ± -	492 ± -	657 ± 41.01	557 ± 121.29			
	Mean Weight(g)			502 ± -	980 ± -	1895 ± 629.33	1318 ± 783.58			
Freshwater drum	Number caught			1		2	3			
	CUE (No/100 yds/day)			0.09		0.19	0.05			
	CUE (Kg/100 yds/day)			0.12		0.22	0.06			
	Mean Length(mm)			454 ± -		431 ± 12.73	439 ± 16.04			
	Mean Weight(g)			1270 ± -		1190 ± 240.42	1217 ± 176.16			

Total effort for each mesh size was 1075 yards of net.

± = standard deviation

Table 24. Mesh size effects on white sucker, shorthead redhorse sucker, mooneye and goldeye catches from West Cross Lake, 1988.

Species	Mesh size (inches)									
	1.50	2.00	3.00	3.75	4.25	5.00	5.25	Total		
White sucker	Number caught	2	9	27	43	71	15	205		
	CUE (No/100 yds/day)	0.47	2.12	6.35	10.12	16.71	3.53	6.89		
	CUE (Kg/100 yds/day)	0.02	1.44	7.12	10.41	20.20	6.26	8.50		
	Mean Length(mm)	155 ± 18.38	317 ± 123.18	401 ± 53.75	399 ± 35.43	418 ± 30.11	453 ± 25.80	482 ± 36.41	416 ± 59.28	
Shorthead redhorse sucker	Mean Weight(g)	53 ± 21.21	679 ± 620.35	1120 ± 403.45	1029 ± 283.27	1209 ± 235.40	1574 ± 237.94	1773 ± 360.17	1234 ± 414.18	
	Number caught	6	12	15	4	1	38	1	38	
	CUE (No/100 yds/day)	1.41	2.82	3.53	0.94	0.24	1.28	1.11	1.28	
	CUE (Kg/100 yds/day)	1.37	2.12	2.83	1.13	0.31	1.11	1.11	1.11	
Mooneye	Mean Length(mm)	395 ± 17.68	363 ± 37.97	373 ± 30.02	418 ± 10.28	430 ± 10.28	430 ± 10.28	430 ± 10.28	430 ± 10.28	
	Mean Weight(g)	973 ± 178.46	751 ± 234.92	803 ± 212.93	1205 ± 108.78	1300 ± 108.78	1300 ± 108.78	1300 ± 108.78	1300 ± 108.78	
	Number caught	2	5	34	7	1	49	1	49	
	CUE (No/100 yds/day)	0.47	1.18	8.00	1.65	0.24	1.64	1.64	1.64	
Goldeye	CUE (Kg/100 yds/day)	0.06	0.32	2.38	0.58	0.06	0.49	0.49	0.49	
	Mean Length(mm)	204 ± 56.57	267 ± 29.86	279 ± 19.72	291 ± 9.80	270 ± 9.80	270 ± 9.80	270 ± 9.80	270 ± 9.80	
	Mean Weight(g)	122 ± 99.70	272 ± 95.27	298 ± 61.82	352 ± 38.91	274 ± 38.91	274 ± 38.91	274 ± 38.91	274 ± 38.91	
	Number caught	1	2	3	3	6	6	6	6	
Goldeye	CUE (No/100 yds/day)	0.24	0.47	0.71	0.71	0.20	0.20	0.20	0.20	
	CUE (Kg/100 yds/day)	0.11	0.18	0.25	0.25	0.08	0.08	0.08	0.08	
	Mean Length(mm)	330 ± 11.88	323 ± 9.90	315 ± 14.22	320 ± 11.88	320 ± 11.88	320 ± 11.88	320 ± 11.88	320 ± 11.88	
	Mean Weight(g)	456 ± 52.45	380 ± 33.94	360 ± 53.46	383 ± 52.45	383 ± 52.45	383 ± 52.45	383 ± 52.45	383 ± 52.45	

Total effort for each mesh size was 425 yards of net.

± = standard deviation

Table 25. Mesh size effects on yellow perch, burbot and freshwater drum catches from West Cross Lake, 1988.

Species	Mesh size (inches)						
	1.50	2.00	3.00	3.75	4.25	5.00	5.25
Yellow perch	Number caught	31	1	1			61
	CUE (No/100 yds/day)	6.59	0.24	0.24			2.05
	CUE (Kg/100 yds/day)	0.33	0.06	0.09			0.18
	Mean Length(mm)	150 ± 19.87	192 ± 18.39	262 ± -	291 ± -		176 ± 33.66
	Mean Weight(g)	50 ± 25.76	109 ± 35.94	260 ± -	395 ± -		89 ± 62.59
Burbot	Number caught					1	1
	CUE (No/100 yds/day)					0.24	0.03
	CUE (Kg/100 yds/day)					0.52	0.07
	Mean Length(mm)					680 ± -	680 ± -
Freshwater drum	Number caught					1	2
	CUE (No/100 yds/day)					0.24	0.07
	CUE (Kg/100 yds/day)					0.42	0.13
	Mean Length(mm)					476 ± -	473 ± 4.24
	Mean Weight(g)					1770 ± -	1900 ± 183.85

Total effort for each mesh size was 425 yards of net.

± = standard deviation

Table 26. Mesh size effects on white sucker, shorthead redhorse sucker and yellow perch catches from East Cross Lake, 1988.

Species	Mesh size (inches)								Total
	1.50	2.00	3.00	3.75	4.25	5.00	5.25		
White sucker	Number caught	1	3	1	4	5	7	21	
	CUE (No/100 yds/day)	1.00	3.00	1.00	4.00	5.00	7.00	3.00	
	CUE (Kg/100 yds/day)	0.04	0.99	0.89	4.64	6.91	12.56	3.72	
	Mean Length(mm)	145 ±	267 ± 80.93	378 ±	421 ± 33.72	440 ± 14.60	488 ± 31.90	411 ± 100.99	
	Mean Weight(g)	42 ±	329 ± 331.16	890 ±	1160 ± 259.74	1382 ± 63.80	1794 ± 331.50	1239 ± 609.25	
Shorthead redhorse sucker	Number caught	0	1	5	4	2	0	14	
	CUE (No/100 yds/day)	0.00	1.00	5.00	4.00	2.00	0.00	2.00	
	CUE (Kg/100 yds/day)	0.00	0.95	4.24	3.15	2.11	0.00	1.86	
	Mean Length(mm)		383 ±	376 ± 24.83	368 ± 11.95	404 ± 28.28	428 ± 18.38	386 ± 27.70	
Yellow perch	Mean Weight(g)		950 ±	849 ± 222.50	787 ± 120.54	1055 ± 247.49	1275 ± 148.49	929 ± 233.59	
	Number caught	3	1	4	0	0	0	8	
	CUE (No/100 yds/day)	3.00	1.00	4.00	0.00	0.00	0.00	1.14	
	CUE (Kg/100 yds/day)	0.23	0.27	1.25	0.00	0.00	0.00	0.25	
	Mean Length(mm)	163 ± 49.57	254 ±	263 ± 21.31				224 ± 58.97	
Mean Weight(g)	76 ± 71.44	270 ±	313 ± 99.28				218 ± 140.91		

Total effort for each mesh size was 100 yards of net.
± = standard deviation

Table 27. Age specific size and maturity conditions of whitefish from Sipiwesk Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ s.d. (mm)	Wt $\pm$ s.d. (g)	Mean Condition Factor
			Number Mature	% Mature			
Males	1	3	0	0.0	135 $\pm$ 3.51	32 $\pm$ 3.79	1.28
	2	8	0	0.0	190 $\pm$ 19.80	92 $\pm$ 33.62	1.30
	3	1	1	100.0	370 $\pm$ -	850 $\pm$ -	1.68
	4	1	1	100.0	340 $\pm$ -	594 $\pm$ -	1.51
	5	1	0	0.0	390 $\pm$ -	950 $\pm$ -	1.60
	7	2	1	50.0	395 $\pm$ 74.95	1070 $\pm$ 678.82	1.60
	10	2	2	100.0	464 $\pm$ 67.88	1355 $\pm$ 431.34	1.35
Total		18	5	27.8	288 $\pm$ 138.20	644 $\pm$ 791.65	1.43
Females	1	1	0	0.0	140 $\pm$ -	32 $\pm$ -	1.17
	2	9	0	0.0	179 $\pm$ 11.49	83 $\pm$ 24.26	1.41
	7	1	1	100.0	457 $\pm$ -	1640 $\pm$ -	1.72
	10	2	2	100.0	483 $\pm$ 35.36	1655 $\pm$ 657.61	1.43
	11	1	1	100.0	506 $\pm$ -	2470 $\pm$ -	1.91
	16	1	1	100.0	496 $\pm$ -	2120 $\pm$ -	1.74
Total		15	5	33.3	279 $\pm$ 152.21	688 $\pm$ 932.05	1.47
Both	1	4	0	0.0	137 $\pm$ 3.70	32 $\pm$ 3.10	1.25
	2	17	0	0.0	184 $\pm$ 16.28	87 $\pm$ 28.47	1.36
	3	1	1	100.0	370 $\pm$ -	850 $\pm$ -	1.68
	4	1	1	100.0	340 $\pm$ -	594 $\pm$ -	1.51
	5	1	0	0.0	390 $\pm$ -	950 $\pm$ -	1.60
	7	3	2	66.7	416 $\pm$ 63.96	1260 $\pm$ 581.98	1.64
	10	4	4	100.0	474 $\pm$ 45.53	1505 $\pm$ 485.97	1.39
	11	1	1	100.0	506 $\pm$ -	2470 $\pm$ -	1.91
	16	1	1	100.0	496 $\pm$ -	2120 $\pm$ -	1.74
Total		33	10	30.3	284 $\pm$ 142.25	663 $\pm$ 841.68	1.45

$\pm$ = standard deviation

Number of fish with unknown age that were excluded = 3

Number of fish with unknown sex that were excluded = 1

Number of fish with unknown mat that were excluded = 1

Table 28. Age specific size and maturity conditions of whitefish from West Cross Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ (mm)	s.d.	Wt $\pm$ (g)	s.d.	Mean Condition Factor
			Number Mature	% Mature					
Males	1	1	0	0.0	174 $\pm$	-	72 $\pm$	-	1.37
	2	3	0	0.0	207 $\pm$	14.11	116 $\pm$	35.92	1.28
	3	3	2	66.7	324 $\pm$	61.58	567 $\pm$	305.03	1.55
	4	1	0	0.0	332 $\pm$	-	482 $\pm$	-	1.32
	5	5	5	100.0	420 $\pm$	13.37	1264 $\pm$	174.01	1.70
	6	5	5	100.0	423 $\pm$	12.28	1152 $\pm$	83.49	1.52
	7	1	0	0.0	430 $\pm$	-	1150 $\pm$	-	1.45
	14	1	1	100.0	515 $\pm$	-	2600 $\pm$	-	1.90
Total		20	13	65.0	363 $\pm$	98.78	922 $\pm$	619.65	1.53
Females	2	2	0	0.0	226 $\pm$	33.94	154 $\pm$	90.51	1.24
	3	1	1	100.0	388 $\pm$	-	1000 $\pm$	-	1.71
	4	1	0	0.0	320 $\pm$	-	426 $\pm$	-	1.30
	5	3	2	66.7	446 $\pm$	19.29	1443 $\pm$	186.10	1.62
	6	3	2	66.7	404 $\pm$	26.91	1055 $\pm$	253.03	1.58
	7	1	1	100.0	450 $\pm$	-	1460 $\pm$	-	1.60
	8	3	2	66.7	439 $\pm$	45.88	1397 $\pm$	510.33	1.59
	9	1	1	100.0	503 $\pm$	-	2520 $\pm$	-	1.98
Total		15	9	60.0	399 $\pm$	83.93	1160 $\pm$	637.88	1.56
Both	1	1	0	0.0	174 $\pm$	-	72 $\pm$	-	1.37
	2	5	0	0.0	215 $\pm$	22.27	131 $\pm$	55.85	1.27
	3	4	3	75.0	340 $\pm$	59.60	676 $\pm$	329.89	1.59
	4	2	0	0.0	326 $\pm$	8.49	454 $\pm$	39.60	1.31
	5	8	7	87.5	430 $\pm$	19.88	1331 $\pm$	189.24	1.67
	6	8	7	87.5	416 $\pm$	19.85	1116 $\pm$	157.52	1.54
	7	2	1	50.0	440 $\pm$	14.14	1305 $\pm$	219.20	1.52
	8	3	2	66.7	439 $\pm$	45.88	1397 $\pm$	510.33	1.59
	9	1	1	100.0	503 $\pm$	-	2520 $\pm$	-	1.98
Total		35	22	62.9	378 $\pm$	93.13	1024 $\pm$	629.61	1.55

 $\pm$ = standard deviation

Table 29. Age specific size and maturity conditions of whitefish from East Cross Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ (mm)	s.d.	Wt $\pm$ (g)	s.d.	Mean Condition Factor
			Number Mature	% Mature					
Males	2	2	0	0.0	246 $\pm$	11.31	222 $\pm$	50.91	1.48
	3	1	1	100.0	322 $\pm$	-	504 $\pm$	-	1.51
	5	5	5	100.0	441 $\pm$	10.44	1364 $\pm$	122.80	1.59
	6	1	1	100.0	439 $\pm$	-	1510 $\pm$	-	1.78
	7	2	2	100.0	495 $\pm$	4.24	2170 $\pm$	169.71	1.79
Total		11	9	81.8	404 $\pm$	90.48	1238 $\pm$	677.17	1.62
Females	2	2	0	0.0	264 $\pm$	16.97	247 $\pm$	38.18	1.34
	5	7	7	100.0	463 $\pm$	10.39	1880 $\pm$	245.22	1.88
	7	2	2	100.0	512 $\pm$	0.00	2200 $\pm$	282.84	1.64
	9	1	1	100.0	508 $\pm$	-	2210 $\pm$	-	1.69
	10	1	1	100.0	540 $\pm$	-	2840 $\pm$	-	1.80
	13	1	1	100.0	558 $\pm$	-	3240 $\pm$	-	1.86
	16	1	1	100.0	592 $\pm$	-	3800 $\pm$	-	1.83
Total		15	13	86.7	466 $\pm$	91.96	2010 $\pm$	937.13	1.75
Both	2	4	0	0.0	255 $\pm$	15.71	235 $\pm$	39.48	1.41
	3	1	1	100.0	322 $\pm$	-	504 $\pm$	-	1.51
	5	12	12	100.0	454 $\pm$	15.23	1665 $\pm$	329.97	1.76
	6	1	1	100.0	439 $\pm$	-	1510 $\pm$	-	1.78
	7	4	4	100.0	504 $\pm$	10.12	2185 $\pm$	191.22	1.72
	9	1	1	100.0	508 $\pm$	-	2210 $\pm$	-	1.69
	10	1	1	100.0	540 $\pm$	-	2840 $\pm$	-	1.80
	13	1	1	100.0	558 $\pm$	-	3240 $\pm$	-	1.86
	16	1	1	100.0	592 $\pm$	-	3800 $\pm$	-	1.83
Total		26	22	84.6	440 $\pm$	94.78	1683 $\pm$	909.04	1.70

$\pm$ = standard deviation

Table 30. Age specific size and maturity conditions of cisco from Sipiwesk Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ s.d. (mm)	Wt $\pm$ s.d. (g)	Mean Condition Factor
			Number Mature	% Mature			
Males	1	22	0	0.0	128 $\pm$ 4.56	28 $\pm$ 3.05	1.34
	2	52	2	3.8	159 $\pm$ 15.65	58 $\pm$ 22.07	1.39
	3	15	3	20.0	196 $\pm$ 16.40	106 $\pm$ 28.81	1.38
	4	18	15	83.3	259 $\pm$ 23.81	282 $\pm$ 100.37	1.57
	5	7	6	85.7	294 $\pm$ 16.81	455 $\pm$ 118.68	1.75
	6	1	1	100.0	340 $\pm$ -	704 $\pm$ -	1.79
	7	2	2	100.0	328 $\pm$ 48.08	673 $\pm$ 349.31	1.81
	8	3	3	100.0	318 $\pm$ 24.13	529 $\pm$ 130.16	1.62
	9	4	4	100.0	344 $\pm$ 34.45	777 $\pm$ 212.45	1.88
	10	2	2	100.0	332 $\pm$ 16.26	685 $\pm$ 131.52	1.87
	11	1	1	100.0	306 $\pm$ -	480 $\pm$ -	1.68
Total		127	39	30.7	197 $\pm$ 68.20	174 $\pm$ 215.48	1.46
Females	1	21	0	0.0	133 $\pm$ 18.03	34 $\pm$ 20.19	1.36
	2	44	2	4.5	159 $\pm$ 19.03	57 $\pm$ 24.00	1.35
	3	13	4	30.8	214 $\pm$ 30.17	153 $\pm$ 76.03	1.44
	4	21	17	81.0	259 $\pm$ 30.17	291 $\pm$ 121.65	1.59
	5	5	5	100.0	307 $\pm$ 29.42	524 $\pm$ 171.09	1.75
	6	4	4	100.0	326 $\pm$ 24.19	615 $\pm$ 99.63	1.78
	7	10	10	100.0	319 $\pm$ 27.03	569 $\pm$ 131.69	1.73
	8	1	1	100.0	306 $\pm$ -	486 $\pm$ -	1.70
	10	4	4	100.0	359 $\pm$ 36.53	804 $\pm$ 171.01	1.74
	11	4	4	100.0	372 $\pm$ 13.49	930 $\pm$ 140.00	1.80
	12	1	1	100.0	402 $\pm$ -	1230 $\pm$ -	1.89
Total		128	52	40.6	216 $\pm$ 79.32	237 $\pm$ 273.18	1.49
Both	1	43	0	0.0	131 $\pm$ 13.09	31 $\pm$ 14.38	1.35
	2	96	4	4.2	159 $\pm$ 17.18	57 $\pm$ 22.87	1.37
	3	28	7	25.0	205 $\pm$ 25.08	128 $\pm$ 59.56	1.41
	4	39	32	82.1	259 $\pm$ 27.07	287 $\pm$ 110.96	1.58
	5	12	11	91.7	300 $\pm$ 22.73	484 $\pm$ 140.04	1.75
	6	5	5	100.0	328 $\pm$ 21.93	633 $\pm$ 94.97	1.78
	7	12	12	100.0	321 $\pm$ 28.64	587 $\pm$ 164.06	1.74
	8	4	4	100.0	315 $\pm$ 20.55	518 $\pm$ 108.43	1.64
	9	4	4	100.0	344 $\pm$ 34.45	777 $\pm$ 212.45	1.88
	10	6	6	100.0	350 $\pm$ 32.43	764 $\pm$ 157.32	1.78
	11	5	5	100.0	359 $\pm$ 31.74	840 $\pm$ 234.95	1.77
	12	1	1	100.0	402 $\pm$ -	1230 $\pm$ -	1.89
Total		255	91	35.7	206 $\pm$ 74.39	206 $\pm$ 247.59	1.48

 $\pm$ = standard deviation

Number of fish with unknown age that were excluded = 208

Number of fish with unknown sex that were excluded = 197

Number of fish with unknown mat that were excluded = 197

Table 31. Age specific size and maturity conditions of cisco from West Cross Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ s.d. (mm)	Wt $\pm$ s.d. (g)	Mean Condition Factor
			Number Mature	% Mature			
Males	1	26	0	0.0	156 $\pm$ 15.83	59 $\pm$ 24.67	1.50
	2	73	2	2.7	199 $\pm$ 17.96	126 $\pm$ 35.21	1.56
	3	10	6	60.0	262 $\pm$ 43.21	320 $\pm$ 172.55	1.59
	4	20	17	85.0	290 $\pm$ 38.35	447 $\pm$ 240.41	1.70
	5	22	21	95.5	347 $\pm$ 36.66	819 $\pm$ 272.92	1.88
	6	21	21	100.0	317 $\pm$ 32.90	557 $\pm$ 229.13	1.66
	7	4	4	100.0	345 $\pm$ 47.45	774 $\pm$ 446.31	1.74
	8	2	2	100.0	342 $\pm$ 28.28	708 $\pm$ 214.96	1.74
	9	5	5	100.0	358 $\pm$ 35.13	819 $\pm$ 347.18	1.70
Total		183	78	42.6	247 $\pm$ 74.20	334 $\pm$ 323.52	1.63
Females	1	25	0	0.0	153 $\pm$ 6.62	53 $\pm$ 8.01	1.50
	2	60	0	0.0	205 $\pm$ 12.84	133 $\pm$ 28.28	1.52
	3	7	2	28.6	260 $\pm$ 31.99	279 $\pm$ 119.18	1.52
	4	21	12	57.1	301 $\pm$ 44.24	518 $\pm$ 312.16	1.70
	5	24	23	95.8	351 $\pm$ 43.41	867 $\pm$ 343.46	1.86
	6	22	18	81.8	304 $\pm$ 31.14	483 $\pm$ 261.45	1.62
	7	1	1	100.0	396 $\pm$ -	1220 $\pm$ -	1.96
	8	3	3	100.0	330 $\pm$ 23.07	577 $\pm$ 90.37	1.60
	9	7	7	100.0	376 $\pm$ 57.27	1089 $\pm$ 650.41	1.86
	10	1	1	100.0	354 $\pm$ -	820 $\pm$ -	1.85
	12	1	1	100.0	352 $\pm$ -	820 $\pm$ -	1.88
Total		172	68	39.5	256 $\pm$ 77.56	382 $\pm$ 391.82	1.62
Both	1	51	0	0.0	154 $\pm$ 12.23	56 $\pm$ 18.53	1.50
	2	133	2	1.5	202 $\pm$ 16.11	129 $\pm$ 32.35	1.54
	3	17	8	47.1	261 $\pm$ 37.88	303 $\pm$ 149.99	1.56
	4	41	29	70.7	295 $\pm$ 41.36	483 $\pm$ 278.32	1.70
	5	46	44	95.7	349 $\pm$ 39.94	844 $\pm$ 309.28	1.87
	6	43	39	90.7	310 $\pm$ 32.40	519 $\pm$ 246.16	1.64
	7	5	5	100.0	355 $\pm$ 47.11	863 $\pm$ 434.99	1.79
	8	5	5	100.0	335 $\pm$ 22.57	629 $\pm$ 144.17	1.66
	9	12	12	100.0	368 $\pm$ 48.16	976 $\pm$ 542.19	1.79
	10	1	1	100.0	354 $\pm$ -	820 $\pm$ -	1.85
	12	1	1	100.0	352 $\pm$ -	820 $\pm$ -	1.88
Total		355	146	41.1	251 $\pm$ 75.90	358 $\pm$ 358.54	1.62

 $\pm$ = standard deviation

Number of fish with unknown age that were excluded = 260

Number of fish with unknown sex that were excluded = 288

Number of fish with unknown mat that were excluded = 261

Table 32. Age specific size and maturity conditions of cisco from East Cross Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ s.d. (mm)	Wt $\pm$ s.d. (g)	Mean Condition Factor
			Number Mature	% Mature			
Males	2	7	1	14.3	202 $\pm$ 28.57	123 $\pm$ 51.51	1.40
	3	1	1	100.0	330 $\pm$ -	630 $\pm$ -	1.75
	4	6	6	100.0	338 $\pm$ 24.52	674 $\pm$ 150.49	1.73
	5	1	1	100.0	342 $\pm$ -	740 $\pm$ -	1.85
	6	2	2	100.0	359 $\pm$ 7.78	930 $\pm$ 56.57	2.02
	7	1	1	100.0	370 $\pm$ -	870 $\pm$ -	1.72
	9	1	1	100.0	422 $\pm$ -	1360 $\pm$ -	1.81
Total		19	13	68.4	296 $\pm$ 79.18	545 $\pm$ 379.25	1.65
Females	2	8	2	25.0	216 $\pm$ 15.84	148 $\pm$ 43.18	1.43
	3	3	3	100.0	273 $\pm$ 20.23	329 $\pm$ 69.36	1.59
	4	2	2	100.0	365 $\pm$ 13.44	890 $\pm$ 183.85	1.82
	5	5	5	100.0	375 $\pm$ 31.52	1079 $\pm$ 321.84	2.00
	6	3	3	100.0	361 $\pm$ 28.87	870 $\pm$ 328.89	1.80
	7	2	2	100.0	430 $\pm$ 19.80	1620 $\pm$ 28.28	2.05
	8	2	2	100.0	414 $\pm$ 22.63	1530 $\pm$ 353.55	2.13
	9	2	2	100.0	467 $\pm$ 9.90	2050 $\pm$ 240.42	2.01
Total		27	21	77.8	328 $\pm$ 89.73	828 $\pm$ 646.56	1.77
Both	2	15	3	20.0	210 $\pm$ 23.03	137 $\pm$ 47.32	1.42
	3	4	4	100.0	288 $\pm$ 32.80	404 $\pm$ 160.96	1.63
	4	8	8	100.0	344 $\pm$ 24.69	728 $\pm$ 176.16	1.75
	5	6	6	100.0	369 $\pm$ 31.21	1023 $\pm$ 319.44	1.98
	6	5	5	100.0	360 $\pm$ 20.81	894 $\pm$ 236.54	1.88
	7	3	3	100.0	410 $\pm$ 37.36	1370 $\pm$ 433.47	1.94
	8	2	2	100.0	414 $\pm$ 22.63	1530 $\pm$ 353.55	2.13
	9	3	3	100.0	452 $\pm$ 26.91	1820 $\pm$ 433.13	1.94
Total		46	34	73.9	315 $\pm$ 86.12	711 $\pm$ 564.69	1.72

$\pm$ = standard deviation

Number of fish with unknown age that were excluded = 0

Number of fish with unknown sex that were excluded = 1

Number of fish with unknown mat that were excluded = 1

Table 33. Age specific size and maturity conditions of walleye from Sipiwesk Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ (mm)	s.d.	Wt $\pm$ (g)	s.d.	Mean Condition Factor
			Number Mature	% Mature					
Males	1	1	0	0.0	172 $\pm$	-	52 $\pm$	-	1.02
	2	9	0	0.0	179 $\pm$	23.10	61 $\pm$	29.22	1.02
	4	5	0	0.0	276 $\pm$	21.14	226 $\pm$	54.20	1.05
	5	27	4	14.8	314 $\pm$	35.52	361 $\pm$	128.17	1.11
	6	5	2	40.0	365 $\pm$	28.87	576 $\pm$	160.46	1.16
	7	32	18	56.3	354 $\pm$	35.01	501 $\pm$	180.19	1.09
	8	9	8	88.9	357 $\pm$	22.13	511 $\pm$	109.02	1.11
	9	13	12	92.3	368 $\pm$	29.51	601 $\pm$	147.30	1.19
	10	4	4	100.0	356 $\pm$	7.68	479 $\pm$	63.09	1.06
	11	3	3	100.0	367 $\pm$	10.44	564 $\pm$	32.96	1.14
	12	7	6	85.7	369 $\pm$	21.53	568 $\pm$	87.80	1.12
	13	4	4	100.0	396 $\pm$	22.71	664 $\pm$	92.32	1.07
	14	4	4	100.0	388 $\pm$	18.84	679 $\pm$	137.41	1.15
	15	11	11	100.0	385 $\pm$	17.39	668 $\pm$	85.57	1.16
	16	1	1	100.0	394 $\pm$	-	794 $\pm$	-	1.30
	18	3	3	100.0	392 $\pm$	30.66	712 $\pm$	195.95	1.16
	21	1	1	100.0	442 $\pm$	-	1070 $\pm$	-	1.24
	22	1	1	100.0	424 $\pm$	-	900 $\pm$	-	1.18
	25	1	1	100.0	400 $\pm$	-	762 $\pm$	-	1.19
	29	1	1	100.0	418 $\pm$	-	778 $\pm$	-	1.07
Total		142	84	59.2	342 $\pm$	60.66	490 $\pm$	216.68	1.11
Females	1	2	0	0.0	173 $\pm$	4.24	55 $\pm$	6.36	1.05
	2	7	0	0.0	177 $\pm$	17.03	56 $\pm$	20.41	0.99
	3	1	0	0.0	222 $\pm$	-	112 $\pm$	-	1.02
	4	1	0	0.0	264 $\pm$	-	190 $\pm$	-	1.03
	5	13	1	7.7	307 $\pm$	45.88	336 $\pm$	139.44	1.09
	6	7	3	42.9	348 $\pm$	37.20	501 $\pm$	178.67	1.15
	7	30	17	56.7	380 $\pm$	33.60	635 $\pm$	197.21	1.13
	8	8	5	62.5	378 $\pm$	20.81	599 $\pm$	94.01	1.10
	9	24	20	83.3	378 $\pm$	17.29	599 $\pm$	98.95	1.11
	10	3	3	100.0	374 $\pm$	7.94	600 $\pm$	81.09	1.14
	11	3	3	100.0	414 $\pm$	22.72	836 $\pm$	93.49	1.18
	12	6	6	100.0	406 $\pm$	35.27	813 $\pm$	208.70	1.19
	13	5	5	100.0	385 $\pm$	12.38	692 $\pm$	63.22	1.22
	14	4	3	75.0	411 $\pm$	23.64	818 $\pm$	181.91	1.16
	15	9	9	100.0	407 $\pm$	40.24	831 $\pm$	248.71	1.20
Total		123	75	61.0	358 $\pm$	67.04	572 $\pm$	253.50	1.12
Both	1	3	0	0.0	173 $\pm$	3.06	54 $\pm$	4.73	1.04
	2	16	0	0.0	178 $\pm$	20.05	59 $\pm$	25.09	1.00
	3	1	0	0.0	222 $\pm$	-	112 $\pm$	-	1.02
	4	6	0	0.0	274 $\pm$	19.57	220 $\pm$	50.68	1.05
	5	40	5	12.5	312 $\pm$	38.74	353 $\pm$	130.70	1.10
	6	12	5	41.7	355 $\pm$	33.71	532 $\pm$	168.05	1.15
	7	62	35	56.5	366 $\pm$	36.42	566 $\pm$	198.82	1.11
	8	17	13	76.5	367 $\pm$	23.56	553 $\pm$	108.93	1.11
	9	37	32	86.5	374 $\pm$	22.40	600 $\pm$	116.14	1.13
	10	7	7	100.0	364 $\pm$	11.85	531 $\pm$	91.50	1.10
	11	6	6	100.0	391 $\pm$	30.21	700 $\pm$	161.63	1.16
	12	13	12	92.3	386 $\pm$	33.37	681 $\pm$	195.21	1.15
	13	9	9	100.0	390 $\pm$	17.37	680 $\pm$	73.67	1.15
	14	8	7	87.5	400 $\pm$	23.23	748 $\pm$	166.60	1.15
	15	20	20	100.0	395 $\pm$	31.07	741 $\pm$	192.06	1.18
	16	1	1	100.0	394 $\pm$	-	794 $\pm$	-	1.30
	18	3	3	100.0	392 $\pm$	30.66	712 $\pm$	195.95	1.16
	21	1	1	100.0	442 $\pm$	-	1070 $\pm$	-	1.24
	22	1	1	100.0	424 $\pm$	-	900 $\pm$	-	1.18
	25	1	1	100.0	400 $\pm$	-	762 $\pm$	-	1.19
	29	1	1	100.0	418 $\pm$	-	778 $\pm$	-	1.07
Total		265	159	60.0	349 $\pm$	64.08	528 $\pm$	237.57	1.12

 $\pm$ = standard deviation

Table 34. Age specific size and maturity conditions of walleye from West Cross Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ s.d. (mm)	Wt $\pm$ s.d. (g)	Mean Condition Factor
			Number Mature	% Mature			
Males	1	10	0	0.0	170 $\pm$ 8.05	49 $\pm$ 6.90	1.00
	2	5	0	0.0	223 $\pm$ 18.06	121 $\pm$ 33.97	1.07
	4	15	1	6.7	322 $\pm$ 28.01	363 $\pm$ 96.68	1.07
	5	52	26	50.0	343 $\pm$ 20.85	468 $\pm$ 84.76	1.15
	6	12	11	91.7	375 $\pm$ 17.77	613 $\pm$ 80.87	1.16
	7	85	83	97.6	395 $\pm$ 20.20	729 $\pm$ 118.39	1.17
	8	9	8	88.9	416 $\pm$ 17.62	847 $\pm$ 89.58	1.18
	9	52	52	100.0	421 $\pm$ 15.33	887 $\pm$ 106.31	1.19
	10	4	4	100.0	411 $\pm$ 26.37	880 $\pm$ 115.76	1.27
	11	2	2	100.0	447 $\pm$ 4.24	1115 $\pm$ 7.07	1.25
	12	12	12	100.0	433 $\pm$ 12.67	994 $\pm$ 78.33	1.22
	13	3	3	100.0	445 $\pm$ 35.55	1050 $\pm$ 190.00	1.19
	14	4	4	100.0	449 $\pm$ 5.03	1083 $\pm$ 70.42	1.19
	15	6	6	100.0	432 $\pm$ 44.23	950 $\pm$ 294.64	1.15
	16	3	3	100.0	448 $\pm$ 16.62	1070 $\pm$ 153.95	1.18
	17	1	1	100.0	456 $\pm$ -	1310 $\pm$ -	1.38
	18	2	2	100.0	436 $\pm$ 4.95	1045 $\pm$ 35.36	1.26
	19	1	1	100.0	445 $\pm$ -	1030 $\pm$ -	1.17
	21	1	1	100.0	502 $\pm$ -	1650 $\pm$ -	1.30
Total		279	220	78.9	381 $\pm$ 61.33	696 $\pm$ 271.63	1.16
Females	1	6	0	0.0	176 $\pm$ 13.89	60 $\pm$ 12.77	1.08
	2	8	1	12.5	258 $\pm$ 91.42	303 $\pm$ 508.17	1.11
	3	2	0	0.0	233 $\pm$ 21.21	140 $\pm$ 45.25	1.09
	4	13	4	30.8	314 $\pm$ 19.60	352 $\pm$ 60.32	1.14
	5	83	62	74.7	358 $\pm$ 23.59	525 $\pm$ 100.17	1.14
	6	13	11	84.6	386 $\pm$ 40.40	666 $\pm$ 204.25	1.13
	7	124	112	90.3	418 $\pm$ 24.44	867 $\pm$ 160.33	1.18
	8	7	7	100.0	443 $\pm$ 34.29	1011 $\pm$ 352.04	1.13
	9	84	82	97.6	456 $\pm$ 21.75	1152 $\pm$ 179.57	1.21
	10	2	2	100.0	443 $\pm$ 17.68	1120 $\pm$ 113.14	1.29
	11	2	2	100.0	457 $\pm$ 9.19	1145 $\pm$ 148.49	1.20
	12	17	17	100.0	475 $\pm$ 31.98	1299 $\pm$ 253.34	1.20
	13	5	5	100.0	481 $\pm$ 17.98	1350 $\pm$ 266.65	1.20
	14	6	6	100.0	438 $\pm$ 52.43	975 $\pm$ 344.17	1.11
	15	2	2	100.0	470 $\pm$ 11.31	1250 $\pm$ 42.43	1.20
	17	1	1	100.0	480 $\pm$ -	1580 $\pm$ -	1.43
	18	3	3	100.0	477 $\pm$ 18.50	1300 $\pm$ 190.79	1.20
Total		378	317	83.9	406 $\pm$ 63.78	843 $\pm$ 348.39	1.17
Both	1	16	0	0.0	172 $\pm$ 10.59	53 $\pm$ 10.44	1.03
	2	13	1	7.7	245 $\pm$ 72.79	233 $\pm$ 399.38	1.09
	3	2	0	0.0	233 $\pm$ 21.21	140 $\pm$ 45.25	1.09
	4	28	5	17.9	318 $\pm$ 24.43	358 $\pm$ 80.58	1.10
	5	135	88	65.2	352 $\pm$ 23.60	503 $\pm$ 98.19	1.14
	6	25	22	88.0	380 $\pm$ 31.51	640 $\pm$ 156.86	1.14
	7	209	195	93.3	409 $\pm$ 25.38	811 $\pm$ 159.67	1.18
	8	16	15	93.8	428 $\pm$ 28.73	919 $\pm$ 246.94	1.15
	9	136	134	98.5	443 $\pm$ 26.03	1051 $\pm$ 202.01	1.20
	10	6	6	100.0	422 $\pm$ 27.21	960 $\pm$ 161.12	1.27
	11	4	4	100.0	452 $\pm$ 8.02	1130 $\pm$ 87.56	1.22
	12	29	29	100.0	458 $\pm$ 32.96	1173 $\pm$ 249.99	1.21
	13	8	8	100.0	467 $\pm$ 29.75	1238 $\pm$ 273.95	1.20
	14	10	10	100.0	442 $\pm$ 39.61	1018 $\pm$ 265.62	1.15
	15	8	8	100.0	441 $\pm$ 41.60	1025 $\pm$ 285.61	1.16
	16	3	3	100.0	448 $\pm$ 16.62	1070 $\pm$ 153.95	1.18
	17	2	2	100.0	468 $\pm$ 16.97	1445 $\pm$ 190.92	1.41
	18	5	5	100.0	460 $\pm$ 26.19	1198 $\pm$ 194.99	1.22
	19	1	1	100.0	445 $\pm$ -	1030 $\pm$ -	1.17
	21	1	1	100.0	502 $\pm$ -	1650 $\pm$ -	1.30
Total		657	537	81.7	395 $\pm$ 63.89	780 $\pm$ 326.03	1.17

 $\pm$ = standard deviation

Number of fish with unknown age that were excluded = 0

Number of fish with unknown sex that were excluded = 1

Number of fish with unknown mat that were excluded = 0

Table 35. Age specific size and maturity conditions of walleye from East Cross Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ (mm)	s.d.	Wt $\pm$ (g)	s.d.	Mean Condition Factor
			Number Mature	% Mature					
Males	0	1	0	0.0	100 $\pm$	-	10 $\pm$	-	1.00
	1	3	0	0.0	146 $\pm$	50.14	40 $\pm$	29.50	1.00
	2	2	0	0.0	203 $\pm$	32.53	99 $\pm$	53.03	1.11
	3	1	0	0.0	200 $\pm$	-	90 $\pm$	-	1.13
	4	2	1	50.0	323 $\pm$	9.90	372 $\pm$	20.51	1.10
	5	20	19	95.0	371 $\pm$	16.05	595 $\pm$	76.66	1.16
	6	7	6	85.7	379 $\pm$	38.14	658 $\pm$	204.90	1.18
	7	40	40	100.0	399 $\pm$	14.46	748 $\pm$	72.23	1.18
	8	3	3	100.0	410 $\pm$	17.79	777 $\pm$	75.72	1.12
	9	11	11	100.0	430 $\pm$	14.11	931 $\pm$	99.26	1.17
	10	1	1	100.0	428 $\pm$	-	900 $\pm$	-	1.15
	12	5	5	100.0	446 $\pm$	8.76	1010 $\pm$	15.81	1.14
	13	1	1	100.0	434 $\pm$	-	980 $\pm$	-	1.20
	14	5	5	100.0	439 $\pm$	4.15	1012 $\pm$	43.24	1.19
	15	1	1	100.0	451 $\pm$	-	1200 $\pm$	-	1.31
	16	1	1	100.0	430 $\pm$	-	960 $\pm$	-	1.21
	17	1	1	100.0	430 $\pm$	-	1040 $\pm$	-	1.31
	18	1	1	100.0	446 $\pm$	-	910 $\pm$	-	1.03
Total		106	96	90.6	385 $\pm$	67.49	719 $\pm$	243.75	1.16
Females	1	3	0	0.0	178 $\pm$	9.71	55 $\pm$	4.00	0.98
	2	1	0	0.0	230 $\pm$	-	128 $\pm$	-	1.05
	3	1	0	0.0	215 $\pm$	-	110 $\pm$	-	1.11
	5	12	12	100.0	383 $\pm$	20.14	651 $\pm$	92.00	1.16
	6	11	11	100.0	391 $\pm$	26.79	703 $\pm$	132.61	1.17
	7	38	38	100.0	427 $\pm$	23.26	915 $\pm$	127.55	1.17
	8	5	5	100.0	443 $\pm$	23.66	1060 $\pm$	149.00	1.22
	9	19	19	100.0	464 $\pm$	21.15	1117 $\pm$	162.17	1.11
	12	2	2	100.0	455 $\pm$	60.81	1100 $\pm$	282.84	1.17
	13	6	6	100.0	472 $\pm$	18.07	1190 $\pm$	113.14	1.13
	14	2	2	100.0	490 $\pm$	31.11	1235 $\pm$	205.06	1.05
	15	2	2	100.0	492 $\pm$	28.28	1385 $\pm$	190.92	1.16
	16	3	3	100.0	506 $\pm$	19.35	1347 $\pm$	95.04	1.04
	18	2	2	100.0	517 $\pm$	15.56	1690 $\pm$	14.14	1.23
	23	1	1	100.0	491 $\pm$	-	1270 $\pm$	-	1.07
Total		108	103	95.4	425 $\pm$	65.12	931 $\pm$	311.83	1.15
Both	0	1	0	0.0	100 $\pm$	-	10 $\pm$	-	1.00
	1	6	0	0.0	162 $\pm$	36.75	47 $\pm$	20.62	0.99
	2	3	0	0.0	212 $\pm$	27.78	108 $\pm$	41.19	1.09
	3	2	0	0.0	208 $\pm$	10.61	100 $\pm$	14.14	1.12
	4	2	1	50.0	323 $\pm$	9.90	372 $\pm$	20.51	1.10
	5	32	31	96.9	375 $\pm$	18.34	616 $\pm$	85.76	1.16
	6	18	17	94.4	386 $\pm$	31.19	685 $\pm$	160.21	1.17
	7	78	78	100.0	412 $\pm$	23.69	830 $\pm$	132.46	1.18
	8	8	8	100.0	431 $\pm$	26.39	954 $\pm$	189.28	1.18
	9	30	30	100.0	451 $\pm$	25.00	1049 $\pm$	167.48	1.13
	10	1	1	100.0	428 $\pm$	-	900 $\pm$	-	1.15
	12	7	7	100.0	449 $\pm$	26.18	1036 $\pm$	124.21	1.15
	13	7	7	100.0	466 $\pm$	21.79	1160 $\pm$	130.26	1.14
	14	7	7	100.0	454 $\pm$	28.06	1076 $\pm$	141.76	1.15
	15	3	3	100.0	478 $\pm$	30.99	1323 $\pm$	172.14	1.21
	16	4	4	100.0	487 $\pm$	41.00	1250 $\pm$	208.33	1.08
	17	1	1	100.0	430 $\pm$	-	1040 $\pm$	-	1.31
	18	3	3	100.0	493 $\pm$	42.44	1430 $\pm$	450.44	1.16
	23	1	1	100.0	491 $\pm$	-	1270 $\pm$	-	1.07
Total		214	199	93.0	405 $\pm$	69.05	826 $\pm$	298.92	1.15

 $\pm$ = standard deviation

Table 36. Age specific size and maturity conditions of sauger from Sipiwesk Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ s.d. (mm)	Wt $\pm$ s.d. (g)	Mean Condition Factor
			Number Mature	% Mature			
Males	4	7	2	28.6	249 $\pm$ 14.34	141 $\pm$ 18.50	0.92
	5	23	14	60.9	246 $\pm$ 20.32	145 $\pm$ 38.55	0.95
	6	14	6	42.9	251 $\pm$ 22.18	156 $\pm$ 32.83	0.98
	7	11	8	72.7	289 $\pm$ 29.77	228 $\pm$ 72.12	0.91
	8	5	4	80.0	298 $\pm$ 41.98	266 $\pm$ 106.59	0.96
	9	1	1	100.0	322 $\pm$ -	297 $\pm$ -	0.89
	10	2	1	50.0	314 $\pm$ 5.66	303 $\pm$ 55.15	0.97
	11	5	5	100.0	311 $\pm$ 26.26	299 $\pm$ 77.47	0.98
	12	2	1	50.0	307 $\pm$ 24.04	271 $\pm$ 55.15	0.93
	14	1	1	100.0	318 $\pm$ -	290 $\pm$ -	0.90
	16	1	1	100.0	358 $\pm$ -	432 $\pm$ -	0.94
Total		72	44	61.1	273 $\pm$ 37.91	203 $\pm$ 87.27	0.95
Females	2	1	0	0.0	169 $\pm$ -	52 $\pm$ -	1.08
	3	2	0	0.0	224 $\pm$ 2.83	107 $\pm$ 15.56	0.95
	4	12	1	8.3	261 $\pm$ 16.01	172 $\pm$ 34.68	0.96
	5	14	6	42.9	256 $\pm$ 34.85	174 $\pm$ 81.95	0.99
	6	17	12	70.6	284 $\pm$ 30.10	232 $\pm$ 72.22	0.99
	7	12	9	75.0	301 $\pm$ 34.13	268 $\pm$ 102.55	0.94
	8	4	4	100.0	316 $\pm$ 35.59	315 $\pm$ 104.69	0.97
	9	1	1	100.0	294 $\pm$ -	208 $\pm$ -	0.82
	10	3	3	100.0	344 $\pm$ 0.00	408 $\pm$ 10.50	1.00
	11	3	3	100.0	359 $\pm$ 31.13	441 $\pm$ 118.36	0.94
	12	5	4	80.0	346 $\pm$ 22.72	376 $\pm$ 80.63	0.90
Total		74	43	58.1	288 $\pm$ 45.70	245 $\pm$ 114.92	0.96
Both	2	1	0	0.0	169 $\pm$ -	52 $\pm$ -	1.08
	3	2	0	0.0	224 $\pm$ 2.83	107 $\pm$ 15.56	0.95
	4	19	3	15.8	256 $\pm$ 16.15	161 $\pm$ 32.90	0.94
	5	37	20	54.1	250 $\pm$ 26.69	156 $\pm$ 59.53	0.97
	6	31	18	58.1	269 $\pm$ 31.21	198 $\pm$ 68.05	0.99
	7	23	17	73.9	296 $\pm$ 31.96	249 $\pm$ 89.76	0.93
	8	9	8	88.9	306 $\pm$ 38.03	288 $\pm$ 102.15	0.96
	9	2	2	100.0	308 $\pm$ 19.80	253 $\pm$ 62.93	0.85
	10	5	4	80.0	332 $\pm$ 16.67	366 $\pm$ 64.38	0.99
	11	8	8	100.0	329 $\pm$ 36.08	352 $\pm$ 113.39	0.97
	12	7	5	71.4	335 $\pm$ 28.33	346 $\pm$ 86.35	0.91
	14	1	1	100.0	318 $\pm$ -	290 $\pm$ -	0.90
	16	1	1	100.0	358 $\pm$ -	432 $\pm$ -	0.94
Total		146	87	59.6	280 $\pm$ 42.48	223 $\pm$ 103.77	0.96

 $\pm$ = standard deviation

Number of fish with unknown age that were excluded = 7

Number of fish with unknown sex that were excluded = 1

Number of fish with unknown mat that were excluded = 1

Table 37. Age specific size and maturity conditions of sauger from West Cross Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ s.d. (mm)		Wt $\pm$ s.d. (g)		Mean Condition Factor
			Number Mature	% Mature					
Males	12	1	1	100.0	350 $\pm$	-	416 $\pm$	-	0.97
	16	1	1	100.0	362 $\pm$	-	471 $\pm$	-	0.99
Total		2	2	100.0	356 $\pm$	8.49	444 $\pm$	38.89	0.98
Females		-	-	-	-	-	-	-	-
Both	12	1	1	100.0	350 $\pm$	-	416 $\pm$	-	0.97
	16	1	1	100.0	362 $\pm$	-	471 $\pm$	-	0.99
Total		2	2	100.0	356 $\pm$	8.49	444 $\pm$	38.89	0.98

Table 38. Age specific size and maturity conditions of northern pike from Sipiwesk Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ s.d. (mm)	Wt $\pm$ s.d. (g)	Mean Condition Factor
			Number Mature	% Mature			
Males	1	4	1	25.0	251 $\pm$ 21.57	111 $\pm$ 29.55	0.69
	2	10	5	50.0	330 $\pm$ 32.97	261 $\pm$ 90.20	0.70
	3	16	14	87.5	397 $\pm$ 41.52	473 $\pm$ 144.85	0.73
	4	26	26	100.0	457 $\pm$ 37.89	710 $\pm$ 167.47	0.74
	5	20	20	100.0	477 $\pm$ 44.73	807 $\pm$ 209.89	0.73
	6	14	14	100.0	531 $\pm$ 43.24	1053 $\pm$ 243.51	0.70
	7	5	5	100.0	559 $\pm$ 22.06	1122 $\pm$ 114.98	0.64
	8	1	1	100.0	538 $\pm$ -	900 $\pm$ -	0.58
	10	2	2	100.0	654 $\pm$ 147.08	2155 $\pm$ 1562.71	0.69
	Total	98	86	89.8	451 $\pm$ 88.80	722 $\pm$ 411.46	0.72
Females	1	4	0	0.0	274 $\pm$ 23.74	144 $\pm$ 40.27	0.69
	2	8	0	0.0	311 $\pm$ 18.73	216 $\pm$ 40.85	0.71
	3	16	7	43.8	429 $\pm$ 42.08	578 $\pm$ 166.10	0.71
	4	33	30	90.9	484 $\pm$ 43.25	804 $\pm$ 188.91	0.70
	5	35	30	85.7	514 $\pm$ 36.40	931 $\pm$ 167.97	0.69
	6	41	39	95.1	550 $\pm$ 35.26	1133 $\pm$ 283.73	0.67
	7	11	10	90.9	561 $\pm$ 38.59	1205 $\pm$ 272.70	0.67
	8	5	5	100.0	630 $\pm$ 67.41	1732 $\pm$ 807.26	0.66
	9	4	4	100.0	685 $\pm$ 53.58	2315 $\pm$ 787.63	0.70
	11	1	1	100.0	728 $\pm$ -	1680 $\pm$ -	0.44
	13	1	1	100.0	795 $\pm$ -	3740 $\pm$ -	0.74
	15	1	1	100.0	952 $\pm$ -	6740 $\pm$ -	0.78
	Total	160	128	80.0	509 $\pm$ 97.34	1003 $\pm$ 685.86	0.69
Both	1	8	1	12.5	262 $\pm$ 24.20	128 $\pm$ 37.09	0.69
	2	18	5	27.8	322 $\pm$ 28.49	241 $\pm$ 74.32	0.70
	3	32	21	65.6	413 $\pm$ 44.10	525 $\pm$ 162.30	0.72
	4	59	56	94.9	472 $\pm$ 42.95	762 $\pm$ 184.41	0.72
	5	55	50	90.9	500 $\pm$ 42.98	886 $\pm$ 192.15	0.70
	6	55	53	96.4	545 $\pm$ 37.90	1112 $\pm$ 274.11	0.68
	7	16	15	93.8	561 $\pm$ 33.51	1179 $\pm$ 233.88	0.66
	8	6	6	100.0	615 $\pm$ 71.12	1593 $\pm$ 797.94	0.64
	9	4	4	100.0	685 $\pm$ 53.58	2315 $\pm$ 787.63	0.70
	10	2	2	100.0	654 $\pm$ 147.08	2155 $\pm$ 1562.71	0.69
	11	1	1	100.0	728 $\pm$ -	1680 $\pm$ -	0.44
	13	1	1	100.0	795 $\pm$ -	3740 $\pm$ -	0.74
	15	1	1	100.0	952 $\pm$ -	6740 $\pm$ -	0.78
	Total	258	216	83.7	487 $\pm$ 98.24	896 $\pm$ 611.20	0.70

 $\pm$ = standard deviation

Table 39. Age specific size and maturity conditions of northern pike from West Cross Lake, 1988.

Sex	Age (Years)	Number	Maturity Number % Mature	Fl $\pm$ s.d. (mm)	Wt $\pm$ s.d. (g)	Mean Condition Factor
Males	2	5	5 100.0	329 $\pm$ 24.12	250 $\pm$ 63.12	0.69
	3	25	24 96.0	423 $\pm$ 45.13	534 $\pm$ 151.08	0.69
	4	31	28 90.3	470 $\pm$ 38.95	741 $\pm$ 219.79	0.69
	5	15	15 100.0	505 $\pm$ 61.96	951 $\pm$ 365.94	0.71
	6	14	13 92.9	549 $\pm$ 36.70	1136 $\pm$ 263.91	0.67
	7	5	5 100.0	597 $\pm$ 34.37	1490 $\pm$ 356.09	0.69
	8	2	2 100.0	594 $\pm$ 33.94	1495 $\pm$ 346.48	0.71
	Total	97	92 94.8	477 $\pm$ 75.08	806 $\pm$ 382.80	0.69
Females	2	2	1 50.0	367 $\pm$ 4.24	315 $\pm$ 43.13	0.63
	3	15	12 80.0	446 $\pm$ 43.49	616 $\pm$ 178.14	0.68
	4	39	33 84.6	506 $\pm$ 53.85	924 $\pm$ 339.30	0.68
	5	32	30 93.8	571 $\pm$ 42.86	1304 $\pm$ 318.83	0.69
	6	40	37 92.5	584 $\pm$ 56.38	1400 $\pm$ 473.44	0.68
	7	19	18 94.7	664 $\pm$ 54.60	1992 $\pm$ 630.58	0.66
	8	10	10 100.0	673 $\pm$ 72.87	2158 $\pm$ 869.58	0.68
	9	5	5 100.0	708 $\pm$ 62.23	2668 $\pm$ 650.13	0.74
	10	1	1 100.0	868 $\pm$ -	5360 $\pm$ -	0.82
	11	1	1 100.0	852 $\pm$ -	4450 $\pm$ -	0.72
	12	1	1 100.0	880 $\pm$ -	4720 $\pm$ -	0.69
	16	1	1 100.0	741 $\pm$ -	3140 $\pm$ -	0.77
	Total	166	150 90.4	572 $\pm$ 97.81	1410 $\pm$ 825.81	0.68
Both	2	7	6 85.7	340 $\pm$ 27.04	269 $\pm$ 62.85	0.67
	3	40	36 90.0	432 $\pm$ 45.33	565 $\pm$ 164.41	0.68
	4	70	61 87.1	490 $\pm$ 50.76	843 $\pm$ 304.58	0.69
	5	47	45 95.7	550 $\pm$ 58.04	1191 $\pm$ 370.18	0.70
	6	54	50 92.6	575 $\pm$ 53.87	1332 $\pm$ 442.41	0.68
	7	24	23 95.8	650 $\pm$ 57.52	1887 $\pm$ 613.62	0.66
	8	12	12 100.0	660 $\pm$ 73.50	2048 $\pm$ 834.39	0.68
	9	5	5 100.0	708 $\pm$ 62.23	2668 $\pm$ 650.13	0.74
	10	1	1 100.0	868 $\pm$ -	5360 $\pm$ -	0.82
	11	1	1 100.0	852 $\pm$ -	4450 $\pm$ -	0.72
	12	1	1 100.0	880 $\pm$ -	4720 $\pm$ -	0.69
	16	1	1 100.0	741 $\pm$ -	3140 $\pm$ -	0.77
	Total	263	242 92.0	537 $\pm$ 101.12	1187 $\pm$ 753.97	0.69

 $\pm$ = standard deviation

Table 40. Age specific size and maturity conditions of northern pike from East Cross Lake, 1988.

Sex	Age (Years)	Number	Maturity		Fl $\pm$ s.d. (mm)	Wt $\pm$ s.d. (g)	Mean Condition Factor
			Number Mature	% Mature			
Males	1	2	2	100.0	317 $\pm$ 18.38	232 $\pm$ 73.54	0.72
	2	4	4	100.0	358 $\pm$ 60.93	317 $\pm$ 139.87	0.67
	3	13	13	100.0	445 $\pm$ 54.80	634 $\pm$ 192.50	0.72
	4	19	19	100.0	509 $\pm$ 68.34	994 $\pm$ 677.17	0.70
	5	18	18	100.0	510 $\pm$ 40.08	959 $\pm$ 221.38	0.71
	6	10	10	100.0	548 $\pm$ 31.71	1099 $\pm$ 240.50	0.66
	7	3	3	100.0	617 $\pm$ 9.02	1460 $\pm$ 177.76	0.62
	8	4	4	100.0	598 $\pm$ 66.12	1578 $\pm$ 514.87	0.72
	9	3	3	100.0	744 $\pm$ 40.84	3553 $\pm$ 803.08	0.85
	10	1	1	100.0	642 $\pm$ -	2060 $\pm$ -	0.78
	13	1	1	100.0	560 $\pm$ -	1300 $\pm$ -	0.74
Total		78	78	100.0	511 $\pm$ 93.33	1049 $\pm$ 718.36	0.70
Females	1	1	0	0.0	270 $\pm$ -	128 $\pm$ -	0.65
	2	2	1	50.0	407 $\pm$ 38.89	450 $\pm$ 122.33	0.66
	3	5	3	60.0	430 $\pm$ 65.54	572 $\pm$ 229.08	0.69
	4	17	17	100.0	512 $\pm$ 32.56	862 $\pm$ 181.64	0.64
	5	19	19	100.0	546 $\pm$ 51.77	1151 $\pm$ 370.59	0.69
	6	15	15	100.0	604 $\pm$ 71.81	1607 $\pm$ 952.00	0.68
	7	12	12	100.0	672 $\pm$ 57.89	2425 $\pm$ 767.94	0.78
	8	13	13	100.0	710 $\pm$ 37.38	2572 $\pm$ 715.26	0.71
	9	14	14	100.0	776 $\pm$ 49.04	3734 $\pm$ 758.24	0.79
	10	4	4	100.0	670 $\pm$ 142.82	2488 $\pm$ 1673.51	0.73
	11	5	5	100.0	816 $\pm$ 54.36	4426 $\pm$ 1340.01	0.79
	12	3	3	100.0	793 $\pm$ 42.51	4003 $\pm$ 725.97	0.80
Total		110	106	96.4	624 $\pm$ 128.03	2031 $\pm$ 1354.57	0.71
Both	1	3	2	66.7	301 $\pm$ 30.09	197 $\pm$ 79.43	0.69
	2	6	5	83.3	374 $\pm$ 56.19	361 $\pm$ 139.33	0.67
	3	18	16	88.9	441 $\pm$ 56.37	617 $\pm$ 198.27	0.71
	4	36	36	100.0	510 $\pm$ 53.76	932 $\pm$ 505.34	0.67
	5	37	37	100.0	529 $\pm$ 49.19	1057 $\pm$ 318.14	0.70
	6	25	25	100.0	582 $\pm$ 64.57	1404 $\pm$ 784.09	0.67
	7	15	15	100.0	661 $\pm$ 56.18	2232 $\pm$ 792.16	0.75
	8	17	17	100.0	684 $\pm$ 65.42	2338 $\pm$ 789.05	0.71
	9	17	17	100.0	770 $\pm$ 48.18	3702 $\pm$ 743.48	0.80
	10	5	5	100.0	664 $\pm$ 124.30	2402 $\pm$ 1461.85	0.74
	11	5	5	100.0	816 $\pm$ 54.36	4426 $\pm$ 1340.01	0.79
	12	3	3	100.0	793 $\pm$ 42.51	4003 $\pm$ 725.97	0.80
	13	1	1	100.0	560 $\pm$ -	1300 $\pm$ -	0.74
Total		188	184	97.9	577 $\pm$ 127.56	1624 $\pm$ 1231.80	0.71

 $\pm$ = standard deviation

Table 41. Length-weight regressions for fish caught from Sipiwesk Lake, 1988.

Species	Length-weight equation	r	n
Whitefish	$\log_e \text{ weight} = -12.348 + 3.217 (\log_e \text{ length})$	0.997	36
Cisco	$\log_e \text{ weight} = -12.273 + 3.221 (\log_e \text{ length})$	0.993	463
Walleye	$\log_e \text{ weight} = -12.368 + 3.165 (\log_e \text{ length})$	0.994	265
Sauger	$\log_e \text{ weight} = -10.999 + 2.900 (\log_e \text{ length})$	0.986	154
Northern pike	$\log_e \text{ weight} = -11.266 + 2.901 (\log_e \text{ length})$	0.988	258
White sucker	$\log_e \text{ weight} = -11.667 + 3.104 (\log_e \text{ length})$	0.989	461
Longnose sucker	$\log_e \text{ weight} = -3.567 + 1.707 (\log_e \text{ length})$	0.763	5
Shorthead redhorse sucker	$\log_e \text{ weight} = -11.764 + 3.126 (\log_e \text{ length})$	0.989	33
Silver redhorse sucker	insufficient data		1
Mooneye	$\log_e \text{ weight} = -11.997 + 3.147 (\log_e \text{ length})$	0.979	637
Goldeye	$\log_e \text{ weight} = -11.373 + 3.006 (\log_e \text{ length})$	0.953	24
Yellow perch	$\log_e \text{ weight} = -11.365 + 3.055 (\log_e \text{ length})$	0.981	91
Burbot	$\log_e \text{ weight} = -10.955 + 2.854 (\log_e \text{ length})$	0.977	4
Freshwater drum	$\log_e \text{ weight} = -12.427 + 3.209 (\log_e \text{ length})$	0.783	3

Table 42. Length-weight regressions for fish caught from West Cross Lake, 1988.

Species	Length-weight equation	r	n
Whitefish			
Cisco	$\log_e \text{ weight} = -13.049 + 3.333 (\log_e \text{ length})$	0.996	35
Walleye	$\log_e \text{ weight} = -12.109 + 3.195 (\log_e \text{ length})$	0.993	643
Sauger	$\log_e \text{ weight} = -12.248 + 3.149 (\log_e \text{ length})$	0.992	658
Northern pike	insufficient data		2
White sucker	$\log_e \text{ weight} = -12.120 + 3.036 (\log_e \text{ length})$	0.987	263
Shorthead redhorse sucker	$\log_e \text{ weight} = -11.302 + 3.045 (\log_e \text{ length})$	0.987	205
Mooneye	$\log_e \text{ weight} = -11.802 + 3.121 (\log_e \text{ length})$	0.959	38
Goldeye	$\log_e \text{ weight} = -12.206 + 3.179 (\log_e \text{ length})$	0.979	49
Yellow perch	$\log_e \text{ weight} = -14.022 + 3.461 (\log_e \text{ length})$	0.946	6
Burbot	$\log_e \text{ weight} = -12.716 + 3.302 (\log_e \text{ length})$	0.989	61
Freshwater drum	insufficient data		1
	insufficient data		2

Table 43. Length-weight regressions for fish caught from East Cross Lake, 1988.

Species	Length-weight equation	r	n
Whitefish	$\log_e \text{ weight} = -13.034 + 3.337 (\log_e \text{ length})$	0.994	26
Cisco	$\log_e \text{ weight} = -13.777 + 3.489 (\log_e \text{ length})$	0.996	47
Walleye	$\log_e \text{ weight} = -11.851 + 3.080 (\log_e \text{ length})$	0.995	214
Northern pike	$\log_e \text{ weight} = -12.951 + 3.171 (\log_e \text{ length})$	0.986	188
White sucker	$\log_e \text{ weight} = -11.960 + 3.145 (\log_e \text{ length})$	0.998	21
Shorthead redhorse sucker	$\log_e \text{ weight} = -13.942 + 3.485 (\log_e \text{ length})$	0.987	14
Yellow perch	$\log_e \text{ weight} = -12.498 + 3.268 (\log_e \text{ length})$	0.998	8

Table 44. Mortality and survival estimates for whitefish, cisco, walleye, sauger and northern pike from Sipiwek and Cross lakes, 1988.

Species	Lake	Instantaneous mortality (Z)	Annual mortality (A)	Annual survival (S)	r	Age classes used
Whitefish	Sipiwek	0.146	0.136	0.864	0.837	1.*
	W. Cross	0.203	0.184	0.816	0.733	3-16*
	E. Cross	0.132	0.124	0.876	0.700	6-14* 6-16*
Cisco	Sipiwek	0.309	0.265	0.735	0.848	3-12
	W. Cross	0.509	0.399	0.601	0.920	3-12 ³
	E. Cross	0.260	0.229	0.771	0.902	4-9
Walleye	Sipiwek	0.413	0.339	0.661	0.705	8-12 ⁴ *
	W. Cross	0.264	0.232	0.768	0.755	9-12 ⁵
	E. Cross	0.260	0.229	0.771	0.915	7-23
Sauger	Sipiwek	0.336	0.286	0.714	0.936	6-16 ⁶
Northern pike	Sipiwek	0.456	0.366	0.634	0.919	5-15
	W. Cross	0.426	0.347	0.653	0.837	6-16
	E. Cross	0.407	0.334	0.666	0.948	5-13

1. Ages 3, 4, 5 and 7 combined.

2. Ages 6 and 7 combined.

3. Ages 3 and 4 combined.

4. Ages 8 and 9 combined.

5. Ages combined: 8 and 9; 10 and 12.

6. Ages 9 and 10 combined.

* = non-significant at $P = 0.05$.

Table 45. Maturity rate equations and age at maturity for whitefish, cisco, walleye, sauger and northern pike from Sipiwek Lake, 1988.

Species	Lake	Sex	Regression	r	Age at 50% mature (yrs)	Age classes used
Whitefish	Sipiwek	all	insufficient data			
	W. Cross	all	insufficient data			
Cisco	Sipiwek	males	6.626 + -1.806	0.958	3.7	2-5
		females	7.562 + -2.252	0.999	3.4	2-4
	W. Cross	both	6.799 + -1.921	0.984	3.5	2-5
		males	7.034 + -2.125	0.956	3.3	2-5
Walleye	Sipiwek	males	3.542 + -1.009	0.754	3.5	3-6*
		females	6.065 + -1.614	0.898	3.8	2-6
	W. Cross	both	insufficient data			
		all	insufficient data			
Sauger	Sipiwek	males	7.136 + -1.095	0.985	6.5	5-9
		females	6.361 + -0.898	0.939	7.09	5-9
	W. Cross	both	6.182 + -0.912	0.983	6.78	5-9
		males	6.769 + -1.313	0.837	5.2	4-8*
Northern pike	Sipiwek	males	4.306 + -0.974	0.948	4.4	4-7*
		females	4.811 + -1.012	0.955	4.8	4-9
	W. Cross	both	2.90 + -0.895	0.603	3.2	4-6*
		all	4.972 + -1.412	0.770	3.5	4-6*
Walleye	Sipiwek	males	2.762 + -0.514	0.871	5.4	4-8*
		females	6.594 + -1.166	0.940	5.7	4-7*
	W. Cross	both	4.642 + -0.838	0.962	5.5	4-8
		males	2.762 + -1.522	0.987	1.8	1-3*
Sauger	Sipiwek	males	1.061 + -0.577	0.741	1.8	3-7*
		females	2.164 + -0.862	0.900	2.5	1-7
	W. Cross	both	insufficient data			
		all	0.551 + -0.537	0.924	1.0	2-7
Walleye	W. Cross	males	insufficient data			
		females	insufficient data			
Sauger	Sipiwek	males	insufficient data			
		females	insufficient data			

* non-significant at $P = 0.05$.

Table 46. Walford equation data for whitefish, cisco, walleye and northern pike from Sipiwek and Cross lakes, 1988.

Species	Lake	Walford equation	L_{∞}	Age classes used	r
Whitefish	Sipiwek	145.386 + 0.719 (x)	517	1-10	0.848
	W. Cross	125.572 + 0.760 (x)	522	1-9	0.891
	E. Cross	165.304 + 0.720 (x)	598	2-13	0.913
Cisco	Sipiwek	64.153 + 0.858 (x)	453	1-11	0.967
	W. Cross	119.472 + 0.672 (x)	364	1-8	0.873
	E. Cross	140.264 + 0.691 (x)	454	2-8	0.924
Walleye	Sipiwek	64.403 + 0.856 (x)	447	1-13	0.964
	W. Cross	99.883 + 0.790 (x)	477	1-13	0.947
	E. Cross	92.380 + 0.812 (x)	491	0-13	0.953
Sauger	Sipiwek	65.758 + 0.813 (x)	351	3-11	0.933
Northern pike	Sipiwek	88.211 + 0.923 (x)	1151	1-8	0.982
	W. Cross	116.307 + 0.898 (x)	1143	2-11	0.958
	E. Cross	133.241 + 0.852 (x)	899	1-10	0.897

Table 47. Brody relationship for whitefish, cisco, walleye, sauger and northern pike from Sipiwek and Cross lakes, 1988.

Species	Lake	$\text{Loge } (L_{\infty} - lt) = a-b \cdot t$	Age range (years)	r
Whitefish	Sipiwek	$y = 6.069 - 0.230 (x)$	1-10	0.964
	W. Cross	$y = 6.260 - 0.296 (x)$	1-9	0.922
	E. Cross	$y = 6.132 - 0.196 (x)$	2-13	0.980
Cisco	Sipiwek	$y = 5.815 - 0.124 (x)$	1-11	0.961
	W. Cross	$y = 5.648 - 0.378 (x)$	1-8	0.829
	E. Cross	$y = 6.009 - 0.294 (x)$	2-8	0.970
Walleye	Sipiwek	$y = 5.681 - 0.143 (x)$	1-13	0.951
	W. Cross	$y = 6.119 - 0.267 (x)$	1-13	0.979
	E. Cross	$y = 5.979 - 0.211 (x)$	0-13	0.974
Sauger	Sipiwek	$y = 5.654 - 0.236 (x)$	3-11	0.963
Northern pike	Sipiwek	$y = 6.838 - 0.070 (x)$	1-8	0.990
	W. Cross	$y = 6.953 - 0.113 (x)$	2-11	0.959
	E. Cross	$y = 6.546 - 0.143 (x)$	1-10	0.923

Table 48. Least squares regression (power curve) analysis of variance summaries for growth curves from whitefish, cisco, walleye, sauger and northern pike from Sipiwek and Cross lakes, 1988.

Species	Lake	Equation	r	d.f.	F. ratio
Whitefish	Sipiwek	$159.1144 x^{\wedge} 0.481$	0.932	1, 7	46.39
	W. Cross	$180.715 x^{\wedge} 0.447$	0.963	1, 8	103.10
	E. Cross	$212.315 x^{\wedge} 0.398$	0.966	1, 7	98.61
Cisco	Sipiwek	$129.540 x^{\wedge} 0.453$	0.979	1, 10	236.38
	W. Cross	$167.808 x^{\wedge} 0.350$	0.950	1, 9	83.72
	E. Cross	$166.122 x^{\wedge} 0.461$	0.970	1, 6	94.12
Walleye	Sipiwek	$179.913 x^{\wedge} 0.292$	0.934	1, 19	130.92
	W. Cross	$192.594 x^{\wedge} 0.329$	0.952	1, 18	172.93
	E. Cross	$175.552 x^{\wedge} 0.373$ 1.	0.941	1, 16	124.77
Sauger	Sipiwek	$151.664 x^{\wedge} 0.320$	0.962	1, 11	135.09
Northern Pike	Sipiwek	$246.607 x^{\wedge} 0.453$	0.989	1, 11	514.36
	W. Cross	$259.591 x^{\wedge} 0.460$	0.951	1, 10	95.41
	E. Cross	$303.212 x^{\wedge} 0.363$	0.927	1, 11	67.09

1. Age 0+ deleted in order to use power equation.

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LITERATURE CITED

- Gaboury, M.N. and J.W. Patalas. 1981. An interim report on the fisheries impact study of Cross and Pipestone lakes. Man. Dept. Nat. Res. MS Report No. 81-22, 199 pp.
- _____. 1982. The fisheries of Cross, Pipestone, and Walker lakes and effects of hydroelectric development. Man. Dept. Nat. Res. MS Report No. 86-28, 83 pp.
- Kirton, J.A.W. 1985. Fish population data from Rat, Karsakuwigamak, and West and Central Mynarski lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-03. 48pp.
- Patalas, J.W. 1984. Fish population data from Notigi, Wapisu, Threepoint and Footprint lakes, 1983. Man. Dept. Nat. Res. Fish. Br. MS Report No. 84-25. 70pp.

Appendix 1. List of Manitoba Department of Natural Resources Fisheries Branch reports written to date on data collected from the Churchill-Nelson River Diversion under the Northern Flood Agreement Claim numbers 12 and 18. Documents are listed in chronological order of publication.

Year	Title
1984	Patalas, J.W. 1984. Fish population data from Sipiwesk, Split and Stephens lakes, 1983. Man. Dept. Nat. Res. Fish. Br. MS Report No. 84-24, 66pp.
	_____ 1984. Fish population data from Notigi, Wapisu, Threepoint and Footprint lakes, 1983. Man. Dept. Nat. Res. Fish. Br. MS Report No. 84-25, 70pp.
1986	Derksen, A.J. 1986. Ecological Monitoring - Fisheries 1985 Progress Report. Man. Dept. Nat. Res. Fish. Br. April 9, 1986. 43.pp.
	Kirton, J.A.W. 1986. Fish population data from Rat, Karsakuwigamak, and West West and Central Mynarski lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-03, 48pp.
	_____ 1986. Fish population data from Split and Stephens lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-04, 61pp.
	Green, D.J. 1986. Summary of Fish mercury data collected from lakes on the Rat-Burntwood and Nelson River systems, 1983-1985. Man. Dept. Nat. Res. MS Report No. 86-06, 359 pp.
	Mohr, L.C. and J.A.W. Kirton. 1986. Fish population data from Sipiwesk and Cross lakes, 1985. Man. Dept. Nat. Res. Fish. Br. MS Report No. 86-28, 83pp.
1987	Hagenson, I. 1987. Fish population data from Rat and Split lakes, 1985. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-04, 59pp.
	Kirton, J.A.W. 1987. Fish population data from Macheewin, Osik, Footprint and Threepoint lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-06, 78pp.
	Green, D.J. 1987. Summary of fish population data from Rat and Threepoint lakes, 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-07, 47pp.

Appendix 1, continued.

Year	Title
1987	Kirton, J.A.W. and L.C. Mohr. 1987. Fish population data from Wuskwatim and Apussigamasi lakes, 1984. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-08, 44pp.
	Livingston, L. 1987. A checklist of phytoplankton genera for Nelson River and Rat-Burntwood lakes, 1980, 1981 and 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-14, 20pp.
	Hagenson, I. 1987. Fish population data from Split and Stephens lakes, 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-26, 59pp.
	Green, D.J. 1987. Summary of fish population data collected from eight lakes on the Rat-Burntwood River System, 1985. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-27, 130pp.
	Mohr, L. 1987. Fish population data from Sipiwesk and Cross lakes, 1986. Man. Dept. Nat. Res. Fish. Br. MS Report No. 87-28, 87pp.
	Anonymous. 1987. A manual for ecological monitoring - data collection procedures. Man. Dept. Nat. Res. Fish. Br. June, 1987.
	Mohr, L. and Livingston, L. 1987. Ecological monitoring zooplankton analysis methodology for 1986/87. Man. Dept. Nat. Res. Fish. Br. June, 1987.
	Derksen, A.J. and D.J. Green. Total mercury concentrations in large fishes from lakes on the Churchill River Diversion and Nelson River. Canada-Manitoba Agreement on the Study and Monitoring of Mercury in Churchill River Diversion. Tech. Appendices to Summary Report Volume 4, paper no. 17.
1988	Derksen, A.J. et.al. 1988. Ecological Monitoring - Fisheries 1986 Progress Report. Man. Dept. Nat. Res. Fish. Br. March, 1988.
	Livingston, L. 1988. Summary of phytoplankton data for the Nelson River and Rat-Burntwood lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-04, 164pp.

Appendix 1, continued.

Year	Title
1988	Green, D.J. 1988. Summary of fish population data from Rat and Threepoint lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS. Report No. 88-11, 55pp.
	_____, 1988. Summary of fish population data from Sipiwesk and Cross lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-12, 90pp.
	Patalas, J.W. 1988. The effects of commercial fishing on lake sturgeon (<i>Acipenser fulvescens</i>) populations in the Sipiwesk Lake area of the Nelson River, Manitoba, 1987-1988. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-14, 38pp.
	Hagenson, I. 1988. Fish population data from Split and Stephens lakes, 1987. Man. Dept. Nat. Res. Fish. Br. MS Report No. 88-15, 66pp.